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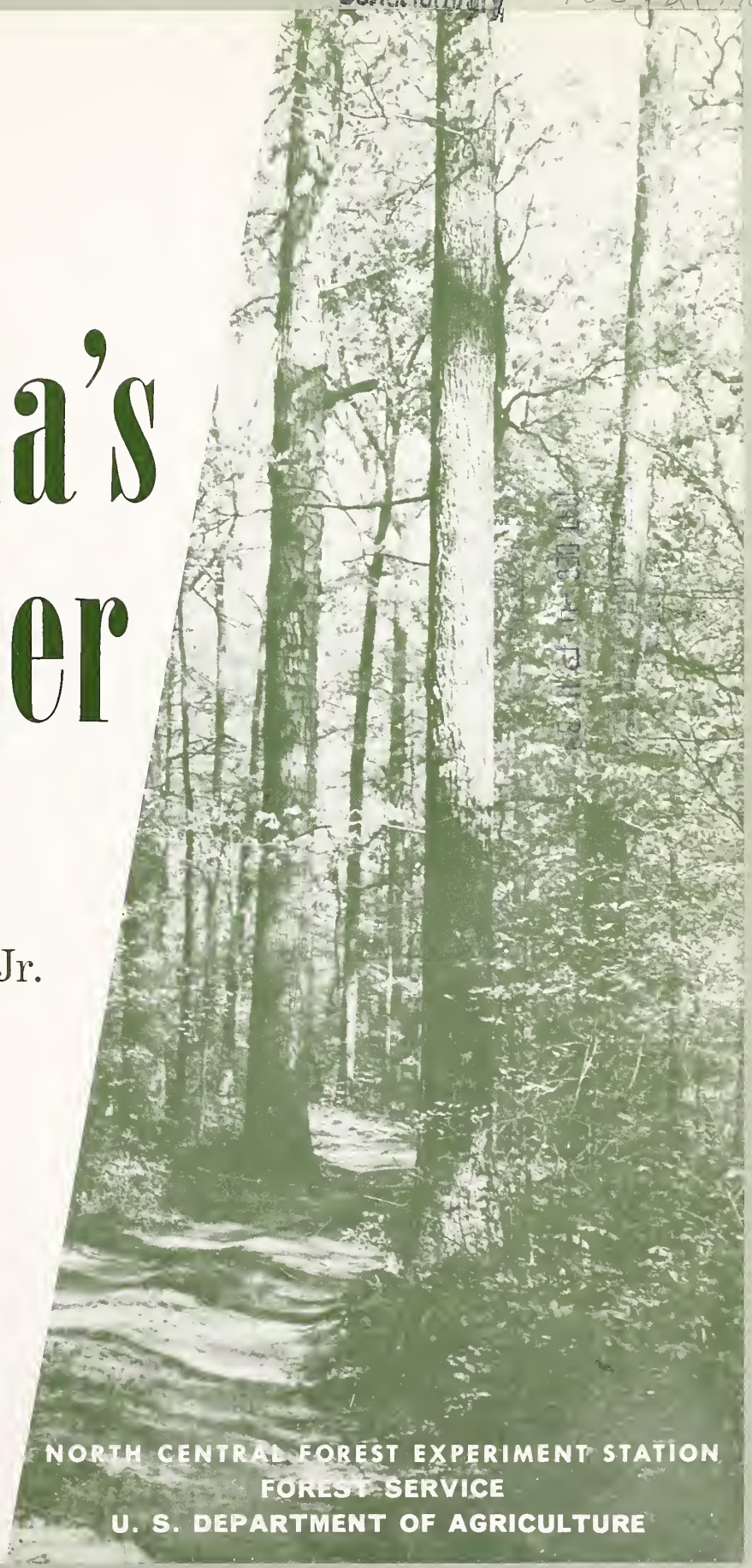
Indiana's Timber

by

John S. Spencer, Jr.



NORTH CENTRAL FOREST EXPERIMENT STATION
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

FOREWORD

This is a report on the second comprehensive survey of Indiana's forest resources. The report on the first inventory, made between November 1949 and December 1950, was entitled "Indiana's Forest Resources and Industries," Forest Resource McNary Forest Research Act of 1928. Fieldwork for the second Survey began in are part of the nation-wide Forest Survey program authorized by the McSweeney-McNary Forest Research Act of 1928. Fieldwork for the second Survey began in August 1966 and was completed in June 1967.

The timber resource of Indiana has changed in many ways since the first Survey. Some of the changes are due to differences in land use and development, timber cutting, tree growth, tree planting and mortality. These changes and their impact on timber supply are explored in the report.

The Survey was made by the North Central Forest Experiment Station, U.S.D.A. Forest Service, with financial support from the Forestry Division, Indiana Department of Natural Resources. The Department of Natural Resources and the Indiana Extension Foresters assisted in a canvass of timber use in Indiana, and Purdue Universisty also assisted in a special study of walnut utilization. The Eastern Region of the U.S.D.A. Forest Service financed data collection on the Hoosier National Forest; the Agricultural Stabilization and Conservation Service provided the necessary aerial photos.

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COVER PHOTO: A forest road through a hardwood stand in the Morgan-Monroe State Forest near Martinsville, Indiana. (Photo courtesy of the Indiana Department of Natural Resources)

HIGHLIGHTS

Timber Volume

- The 1967 volume of growing stock on commercial forest land was 3.5 billion cubic feet, a gain of 25 percent over the 2.8 billion cubic feet in 1950.
- Sawtimber volume was 10.9 billion board feet in 1967, compared with 8.7 billion board feet in 1950.
- The average volume per acre of growing stock rose from 683 cubic feet in 1950 to 899 cubic feet in 1967.
- Sawtimber average volumes per acre were 2,140 board feet in 1950 and 2,794 board feet in 1967.
- Hardwoods, principally oaks, hickory, and hard maple, comprise 98 percent of the State's volume of growing stock.
- Farmers and other individuals own eighty-eight percent of the growing-stock volume.
- In addition to the growing-stock volume, rough and rotten tree volume amounts to 380 million cubic feet and salvable dead tree volume totals 22 million cubic feet.

Stand Conditions

- Net annual growth on growing stock in 1967 was 95.1 million cubic feet and exceeded timber removals by one-third.
- The net annual growth rate averaged 2.7 percent of the inventory of growing stock in 1967. This compares with a 1950 growth rate of 3.8 percent of inventory.
- Growing-stock mortality was 11.7 million cubic feet in 1967 or 0.3 percent of inventory. Diseases accounted for nearly half the mortality.
- About 50 percent of the butt logs of sampled sawtimber trees were in Grades 1 and 2, best of the four log grades used.

Forest Area

- Indiana has 4 million acres of forest land, which amounts to 17 percent of the State's land area.
- The commercial forest included 3.9 million acres in 1967, a slight drop from the 4.1 million acres in 1950.
- The two most extensive forest types are the oak-hickory type, with 61 percent of the commercial area, and the maple-beech-birch type, with 20 percent.
- Farmers own 68 percent of the commercial forest area, mostly in tracts of less than 100 acres.

Timber Use

- Growing-stock removals in 1966 amounted to 64.9 million cubic feet, about two-thirds of the net annual growth and a little more than half of the allowable annual cut.
- Sawtimber removals were 345 million board feet in 1966, 50 percent greater than net growth but only 80 percent of the allowable annual cut.
- Total timber products output in 1966 was 51.1 million cubic feet of roundwood and 9.3 million cubic feet of plant residues.
- Saw logs accounted for two-thirds of the 1966 roundwood products output.
- The number of active, primary wood-using mills and plants dropped from 1,149 in 1949 to 518 in 1966. Four hundred and eighty of the 1966 mills were sawmills.
- Growing-stock removals are projected to increase 58 percent by 1997. Growth on growing stock is projected to remain above removals during this period, however, resulting in a larger inventory in 1997 than in 1966.
- The sawtimber inventory is projected to decrease substantially between 1966 and 1997, because of a continuing excess of sawtimber removals over growth.

INDIANA'S TIMBER

John S. Spencer, Jr.

PRESENT TIMBER SUPPLY

Indiana's woodlands range from farm woodlots dotting the countryside in the northern half of the State to nearly continuous forest cover in parts of the southern half. The generally deep, fertile soils of the north are used principally for agriculture. The south, which contains the bulk of the State's commercial forest land[1], has a mixture of deep soils along the river bottoms and less fertile soils among the low hills.

Indiana's forests are almost exclusively hardwood; the most common species — white oaks, hickory, black oaks, and hard maple — usually grow in mixture with a variety of other central hardwoods (fig. 1). Many of these hardwoods are valuable for furniture, flooring, veneer and other products. Most valuable of all is the much sought-after black walnut.

The value of Indiana's woodlands is not represented solely by forest products, because few forests today are managed only for wood production. Outdoor recreation, wildlife habitat, and watershed protection are other important benefits, and they promise to be even more important in the future. But this report is concerned primarily with timber, and the discussion that follows is limited to that resource.

Growing-Stock Volume on the Increase

Indiana's 1967 volume of live, sound (growing-stock) trees totaled 3.5 billion cubic feet, an increase of more than 25 percent since 1950. This gain was made despite a statewide decline of 4.6 percent in commercial forest land area. Commercial forest area increased in the southern portion of the State where the greatest timber volume is found, however. Average growing-stock volume per acre was 900 cubic feet in 1967 compared with 680 cubic feet in 1950. The principal reason for the increase in growing-stock inventory is the continuing surplus of net annual growth over timber removals. In 1950 growth exceeded removals by a ratio of more than 2 to 1, and in 1967 by a ratio of 3 to 2. The limited market for poletimber-size trees is the major reason growing-stock removals have not been higher, but the pulpwood market for small hardwoods is expected to improve greatly in the future. Timber volume increased in most diameter groups, although it increased most in the 12 to 14-inch diameter group (fig. 2).

Figure 1. — A high-quality sawtimber stand in the oak-hickory type, the largest forest type in Indiana.

[1] *Land that is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization.*

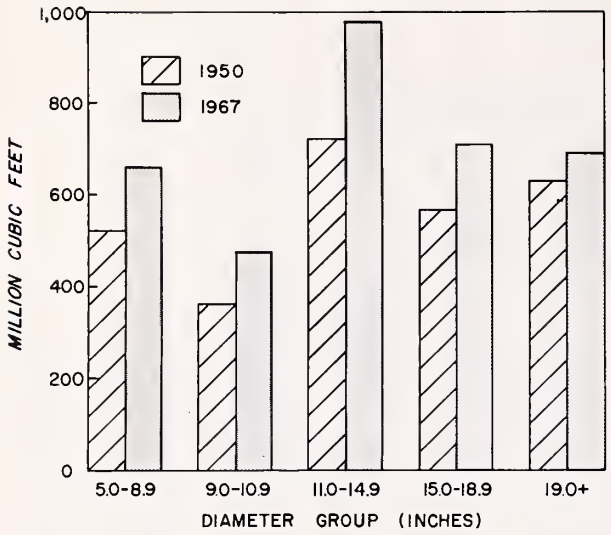

Figure 2. — Growing - stock volume by diameter groups, 1950 and 1967.

Hardwoods make up 98 percent of the growing-stock volume, and five species contain over half the total volume — white oak (14 percent), hickory (13 percent), black oak (9 percent), hard maple (8 percent), and northern red oak (8 percent). The volumes of nearly all species increased between 1950 and 1967 (fig. 3). The major exception was elm, which dropped from 265 million cubic feet in 1950 to 96 million cubic feet in 1967, primarily because of mortality due to elm diseases.

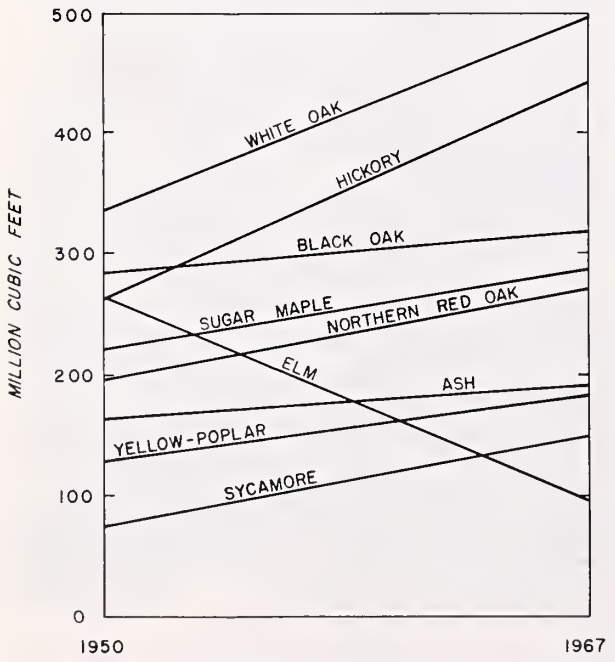

Figure 3. — Change in growing-stock volume for most major species in Indiana, 1950 and 1967.

Small sawtimber-sized trees contain the largest share of growing-stock volume. Two-thirds of the sound, live volume is in trees 11 inches in diameter at breast height (d.b.h.) and larger, but only one-fifth is in trees 19 inches d.b.h. and larger. The 14-inch diameter class contains the most volume.

Eighty-eight percent of Indiana's growing-stock volume is owned by farmers and other individuals. The three southern Forest Survey Units (fig. 4) contain three-fourths of the State's growing-stock volume, with the Knobs Unit alone containing nearly half the total volume (1.7 billion cubic feet). Most

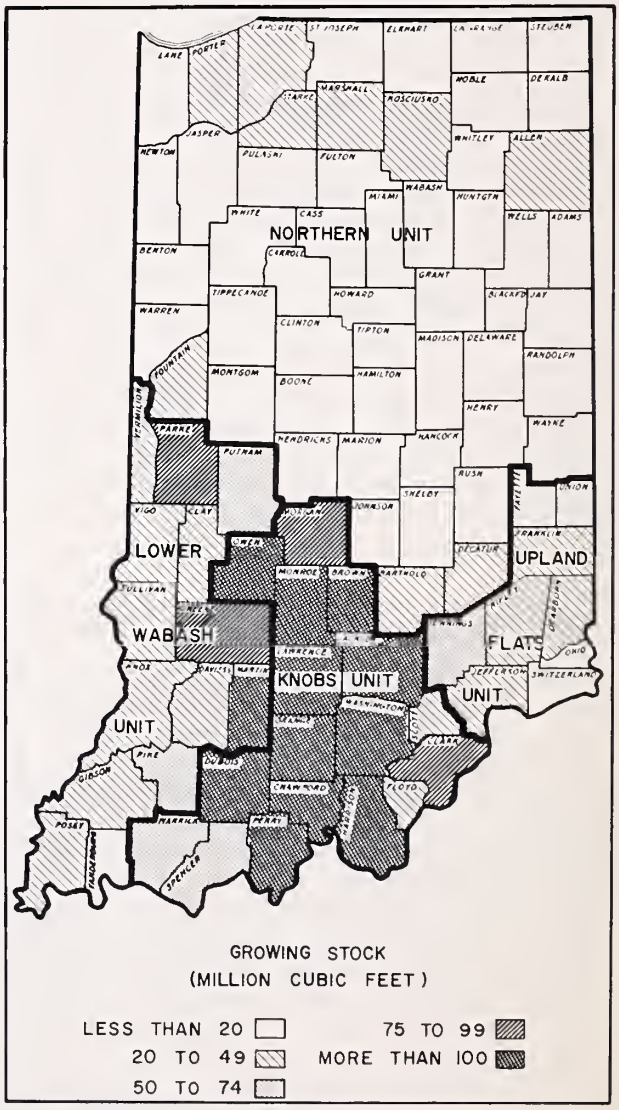

Figure 4. — Location of Forest Survey Units in Indiana, and growing-stock volume by counties, 1967.

of the small volume of softwoods is also found in this hilly Unit. Perry County has the largest volume of growing stock in the State (146 million cubic feet), followed closely by Brown and Washington Counties (144 and 143 million cubic feet, respectively). The Lower Wabash Unit contains 22 percent and the Upland Flats Unit 7 percent of the State's growing-stock volume.

Between 1950 and 1967, growing-stock volume in the three southern Units increased 50 percent, considerably more than the statewide volume gain of 25 percent. Average volume per acre in the southern Units climbed from 600 cubic feet in 1950 to 925 cubic feet in 1967.

The Northern Unit, which contained 1.0 billion cubic feet of growing stock in 1950, declined to 0.8 billion cubic feet in 1967, largely because of the heavy elm mortality and a 20 percent loss in commercial forest area. The average volume slipped from 860 to 820 cubic feet per acre.

In addition to the 3.5 billion cubic feet of growing stock, there are 380 million cubic feet of sound wood in cull trees and 22 million cubic feet in salvable dead trees in Indiana. Most of the cull volume is in rough trees, or trees classed as culls because of roughness, poor form or noncommercial species. Only a small portion of this volume is currently merchantable, but improving markets for pulpwood and chips should consume more of it in the future. The total of all timber in Indiana, then, is estimated to be 3.9 billion cubic feet.

Sawtimber Volume

The sawtimber volume increase between surveys was similar to the growing-stock volume increase. The 1967 sawtimber volume was estimated to be 10.9 billion board feet,[2] a 25-percent gain over the adjusted volume of 8.7 billion board feet in 1950.[3] The volume increased despite removals during part of the period that exceeded net growth, a modest loss of commercial forest area, and an increase in sawtimber mortality, especially for elm.

The increase of sawtimber volume was not uniform throughout the State. The volume increased by two-thirds in the south between surveys, while the volume decreased by one-third in the north:

	1950	*1967*
	(Million board feet)	
South	5,064	8,394
North	3,672	2,491
Total	8,736	10,885

The five species that contain most of the growing-stock volume also contain most of the sawtimber volume, but in different order. White oak remains first with 15 percent of the sawtimber volume, but black oak is second with 11 percent, followed by hickory (11 percent), northern red oak (10 percent), and hard maple (7 percent). Although white oak and hickory increased substantially in volume between surveys, most species increased only slightly, and a few declined (fig. 5). Elm volume dropped drastically.

Sawtimber volume was greater in 1967 in all diameter groups than in 1950 (fig. 6). In addition, a higher proportion of the volume was in small-diameter trees in 1967 than in 1950. Proportionately heavier cutting of large-diameter trees, the major cause of this volume buildup in small trees, will probably continue for some time.

An estimate of quality in Indiana's forests was made by grading the butt log in each sawtimber tree sampled during the 1967 survey. As seen in the following tabulation, 49 percent of the sampled butt logs

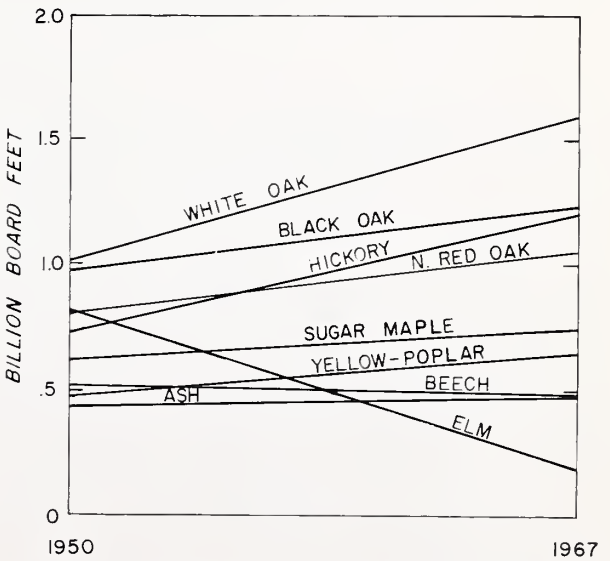

Figure 5. — Change in sawtimber volume for most major species in Indiana, 1950 and 1967.

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[2] *Board-foot volume in saw logs and sawtimber trees is based on International ¼-inch log rule in this report.*

[3] *The 1950 sawtimber inventory, growth, and mortality volumes used throughout this report do not correspond to volumes shown in the publication, "Indiana's Forest Resources and Industries," by O. Keith Hutchison, U.S. Dep. Agr. Forest Resource Rep. 10, August 1956. See Appendix for explanation.*

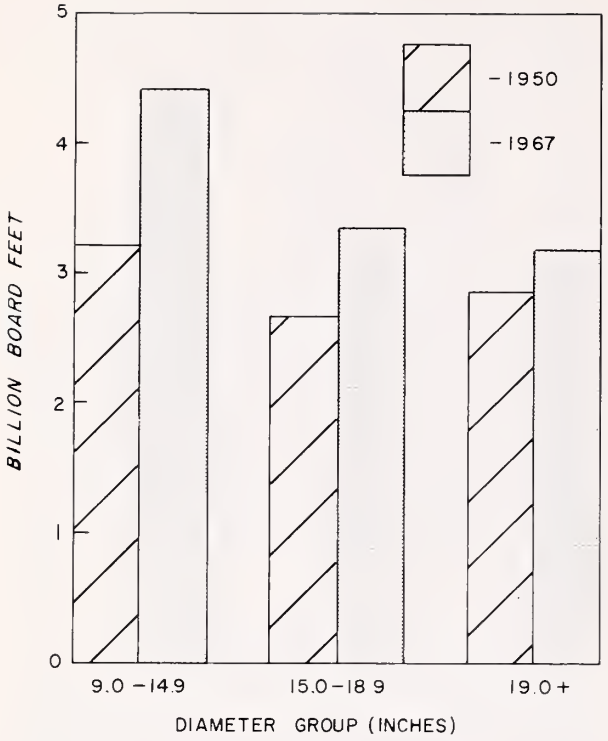

Figure 6. — Sawtimber volume by diameter groups, Indiana, 1950 and 1967.

in Indiana were in the best log grades (Grades 1 and 2)[4]:

Log grade	*Percent*
1	17
2	32
3	46
4	5

The percentage of sawtimber trees with a Grade 1 butt log was especially high for cottonwood. It was also high for "other select white oaks",[5] basswood, and sycamore — species that are in much less demand than cottonwood.

Of course, the butt log does not provide an accurate measure of total quality because it is usually the best log in the tree. For this reason the butt log quality estimates were converted into whole-tree log-grade estimates by using data collected in adjoining states. The percent of total sawtimber volume in each log grade based on these whole-tree estimates is as follows:

Log grade	*Percent*
1	24
2	26
3	38
4	12

Net Growth Rate Falls Since 1950

Net annual growth on growing-stock trees amounted to 106.6 million cubic feet in 1950, or 3.8 percent of the inventory. In 1966 the net growth was slightly lower, at 95.1 million cubic feet; growth rate, however, was only 2.7 percent of the inventory.

Sawtimber net annual growth dropped even faster between surveys. The growth rate in 1950 was 5.0 percent (436.0 million board feet), compared with 2.1 percent (225.8 million board feet) in 1966.

High mortality was a major reason for the decline in growth rate. In general, growing-stock trees in 1966 did not grow appreciably slower than they did in 1950, but more of them died. However, sawtimber trees apparently did grow more slowly in 1967 than in 1950, in addition to having an increase in mortality. Part of the growth-rate decline can also be explained by the decrease in commercial forest land in the north, where the growth rate is the highest in the State. In addition, the mortality of elm, a fast-growing species on moist sites, was extremely high. Stand "high-grading," a common practice in Indiana, also has a depressing effect on growth rates. In this type of harvest the high-value trees are removed and sold, but low-value trees, which are often slow-growing or cull trees, are left standing.

Net annual growth on growing stock exceeds annual removals by a margin of 3 to 2. In 1966, growth was 95.1 million cubic feet and removals 64.9 million cubic feet. This excess of growth over removals is the primary cause of the increase in inventory between surveys.

Sawtimber removals, on the other hand, were greater than net growth in 1966 — 345 million board feet (3.2 percent of inventory), compared with 226 million board feet of net growth (2.1 percent of inventory). The situation is somewhat different from that of 1950 when sawtimber removals were 2.9 percent of inventory and net growth was nearly twice the 1966 amount.

The margin of sawtimber removals over growth in 1966 varied widely by species; several species had more growth than removals (fig. 7). Sugar maple was harvested intensively, about two and one-half times faster than net growth, and black walnut sawtimber removals (not shown in figure 7) were more than four times growth.

[4] *See "Definitions of terms" in Appendix for guides used in log grading.*

[5] *"Other select white oaks" include swamp white oak, bur oak, swamp chestnut oak, and chinkapin oak.*

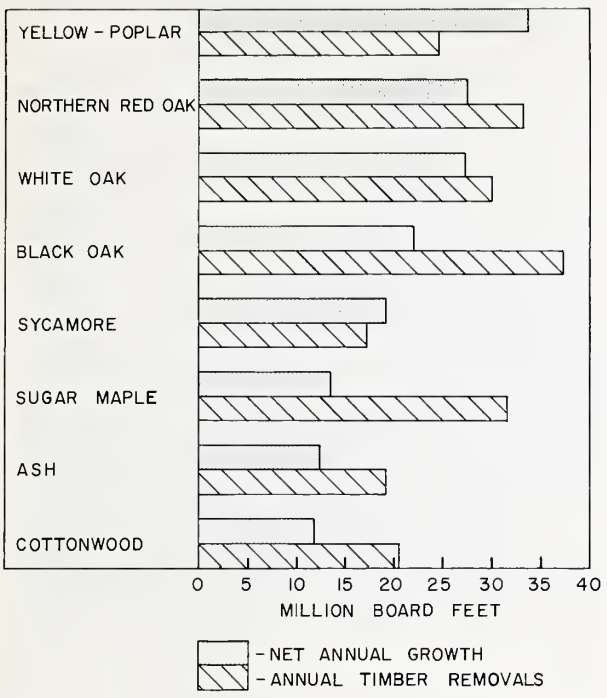

Figure 7. — Comparison of sawtimber net annual growth and annual timber removals for some major species in Indiana, 1966.

Removals Less Than Allowable Cut

Annual allowable cut is the volume that could be cut while bringing the forest to a more productive condition and improving the distribution of age classes. It assumes that all lands will be managed the same way regardless of owner, and at an intensity similar to that practiced on National Forest lands. Allowable cut is merely a guide (See Survey Procedure in appendix), but it is a better figure with which to compare timber removals than net growth because it incorporates the level of cutting suggested for a forest not yet regulated. When a forest becomes regulated or fully managed, allowable cut and growth will be equal.

Even though more sawtimber volume is being removed than is being grown, still more volume could be removed in each of the next 10 years within the estimated annual allowable cut. As explained more fully later, this allowable cut is suggested for only 10 years in order to harvest the many timber stands that are older than the prescribed rotation age, after which it will be greatly reduced.

In comparing allowable cut and 1966 removals, it is clear that removals could be higher. Sawtimber removals were only about 80 percent and growing-stock removals 55 percent of allowable cut. However, much of the difference between the volume of current removals and allowable cut is in species for which there is low demand presently; this is especially true for sawtimber. The species for which allowable cut is greater than present removals include white oak, chestnut oak, post oak, hickory, tupelo, black gum, black cherry, elm, cypress and sycamore. (See tables 40, 42, 58, and 59 in Appendix for comparisons of removals with allowable cut for individual species.) The Northern and Upland Flats Units are being harvested closer to the allowable cut volume than the other two Units (fig. 8).

The rate of growth and removals is highest in northern Indiana, in spite of the fact that nearly 80 percent of the State's timber volume is in the south. Northern Indiana's growing-stock inventory is 22 percent of the State's total, but its removals are 34 percent and its growth 36 percent of the total. In contrast, the Knobs Unit, which has 49 percent of Indiana's inventory of growing stock, contributes only 41 percent of the total growth and 32 percent of the total removals. Even though the north has mostly small timber tracts interspersed throughout the farmlands, these tracts have the highest growth rates in the State and are utilized more intensively than the more continuous stands in the south. Part of the reason for high timber removals in the north is the high proportion of large and medium-sized sawmills in that part of the State (although most of the sawmills are in southern Indiana), and the comparatively high percentage of large-diameter trees. Northern Indiana contains 34 percent of all trees 23 inches d.b.h. and larger.

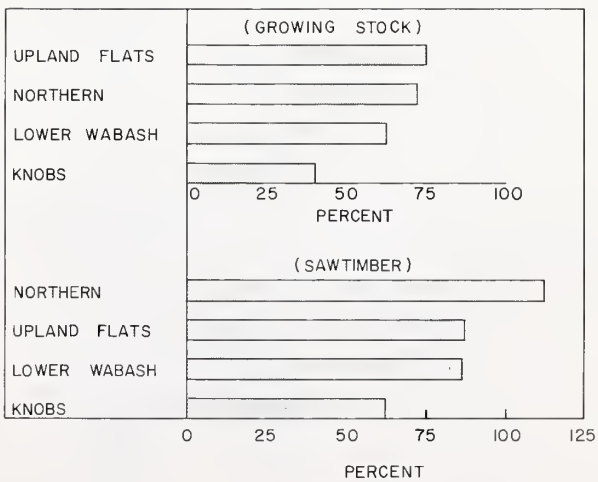

Figure 8. — Percent of annual allowable cut removed in each Survey Unit in Indiana, 1966.

Mortality Climbs

Tree mortality nearly doubled between 1950 and 1966 — growing-stock mortality was only 6.2 million cubic feet in 1950 compared with 11.7 million cubic feet in 1966. Sawtimber mortality increased even faster — from 15.0 million board feet in 1950 to 31.3 million board feet in 1966.

Mortality was particularly high for elm in 1966, averaging 2.8 percent of its growing-stock inventory and 4.8 percent of its sawtimber inventory. The elm diseases, principally Dutch elm disease and to a lesser extent phloem necrosis, were responsible for most of this loss. No other species had as high a mortality rate as elm.

Diseases accounted for nearly half the growing-stock mortality volume and slightly more than half the sawtimber mortality. Other causes of death, principally old-age and suppression by larger trees, were responsible for about one-fourth of the mortality.

Large-Diameter Black Walnut Trees Diminishing

Black walnut deserves special mention because of its high value and short supply of large-diameter trees in Indiana and throughout its entire range. Between 1950 and 1967 black walnut growing-stock volume on commercial forest land remained surprisingly constant. Volume losses in the larger diameter groups were more than offset by gains in the smaller diameter groups, as seen in the following tabulation:

Diameter group	*Black walnut growing-stock volume*	
	1950	*1967*
	(Million cubic feet)	
5.0- 8.9	15.9	16.0
9.0-10.9	10.1	9.4
11.0-14.9	17.1	22.9
15.0-18.9	14.4	12.5
19.0+	5.4	3.7
Total	62.9	64.5

Sawtimber volume of walnut also increased slightly between surveys (fig. 9). A substantial gain was made in the 11.0- to 14.9-inch diameter group, but all other classes showed losses:

Diameter group	*Black walnut sawtimber volume*	
	1950	*1967*
	(Million board feet)	
11.0-14.9	75.0	100.0
15.0-18.9	71.0	61.7
19.0+	23.0	16.1
Total	169.0	177.8

Figure 9. — Two black walnut sawtimber trees in a mixed hardwood stand in Indiana. Indiana's black walnut sawtimber volume on commercial forest land amounts to about 7 percent of the Nation's total.

Walnut trees growing on nonforest land and short-log trees on commercial forest land contain a volume of 17 million cubic feet in Indiana. Short-log trees are those that are not included under growing stock because they contain only 8- to 11-foot saw logs. This volume swells the total usable walnut volume by 26 percent when it is added to the 64.5 million cubic feet of growing stock in the commercial forest (table 1). Walnut sawtimber volume on nonforest land and in short-log trees amounted to 41 million board feet, in addition to the 178 million board feet on commercial forest land.

Table 1. — *Black walnut volume on commercial forest and nonforest land by diameter groups, Indiana, 1967*

Diameter group	On commercial forest land		On nonforest land		Total
	Growing-stock trees	Short-log trees	Growing-stock trees	Short-log trees	
	(Million cubic feet)				
5.0- 8.9	16.0	(1/)	0.6	(1/)	16.6
9.0-10.9	9.4	(1/)	.8	(1/)	10.2
11.0-14.9	22.9	1.9	2.4	1.3	28.5
15.0-18.9	12.5	4.1	3.1	.2	19.9
19.0+	3.7	.1	1.3	1.2	6.3
Total	64.5	6.1	8.2	2.7	81.5

1/ Poletimber-size trees are not classed as short-log trees.

FOREST AREA

One Out of Every Six Acres Is Forested

Of the 23.2 million acres of land in Indiana, almost 4.0 million acres (17 percent) are forested. Nearly all (98 percent) of the forest land is commercial forest. As shown in figure 10, the most intensively forested area in the State is the Knobs Unit, where almost one-half of the State's total commercial forest area is located. The counties with the largest commercial forest areas — Perry, Monroe, Brown, and Harrison — are in the Knobs Unit.

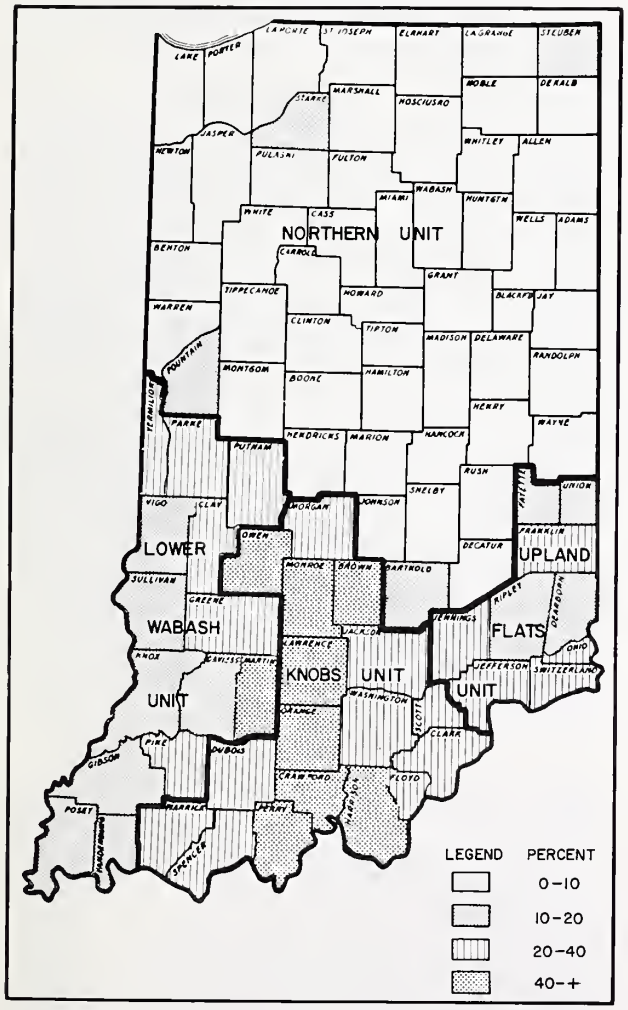

Figure 10. — Percent of land area in commercial forest by county, Indiana, 1967.

The Lower Wabash Unit is flat-to-rolling and contains the wide valleys of the Wabash and White Rivers. About one-fifth of the State's commercial forest area is in this Unit. The Upland Flats Unit contains less than 10 percent of the commercial forest area in the State. Soils in the Northern Unit are level, fertile, and used largely for farming, but the scattered commercial forest area still amounts to nearly one-quarter of the State's total. The following tabulation shows the proportion of commercial forest land in each Unit:

Forest Survey Unit	*Area of commercial forest land* (Thousand acres)	*Percent of State total*
Lower Wabash	836.2	21
Knobs	1,769.2	46
Upland Flats	353.7	9
Northern	936.7	24
All units	3,895.8	100

The modest overall decline in commercial forest from 4.1 million acres in 1950 to 3.9 million acres in 1967 does not reflect the opposing trends in the northern and southern portions of the State. In the Northern Unit commercial forest area dropped 20 percent between surveys, as woodland gave way to agriculture, industrial development, and urbanization. In two of the three southern units, on the other hand, commercial area increased slightly. Of the southern group, only the Upland Flats Unit showed a decline in commercial forest acreage.

Oak-Hickory Type Has Largest Area

Oak-hickory is by far the most extensive forest type in Indiana, with more than 60 percent of the commercial area. Composed primarily of white, black, and northern red oak and hickory, it is the largest forest type in all Survey Units. Maple-beech-birch, the State's second largest forest type, accounts for 20 percent of the total commercial forest. Although distributed over the entire State, this type is most extensive in the Knobs and Northern Units. The other major forest type in terms of area is the elm-ash-cottonwood type, sometimes called the lowland hardwood type. It constitutes 14 percent of the State's commercial forest and is most common along streams

and rivers in southwestern Indiana. The areas by forest types are:

Forest type	*Commercial forest area in 1967* (Thousand acres)
Oak-hickory	2,388.8
Maple-beech-birch	788.0
Elm-ash-cottonwood	553.7
Oak-gum-cypress	52.2
Loblolly-shortleaf pine	54.0
Oak-pine	46.0
Aspen-birch	13.1
All types	3,895.8

Most Commercial Forest Is Privately Owned

Ninety percent of the commercial forest area in Indiana is owned by individuals, almost 70 percent by farmers (fig. 11). The average private woodland holding is small — generally less than 100 acres.

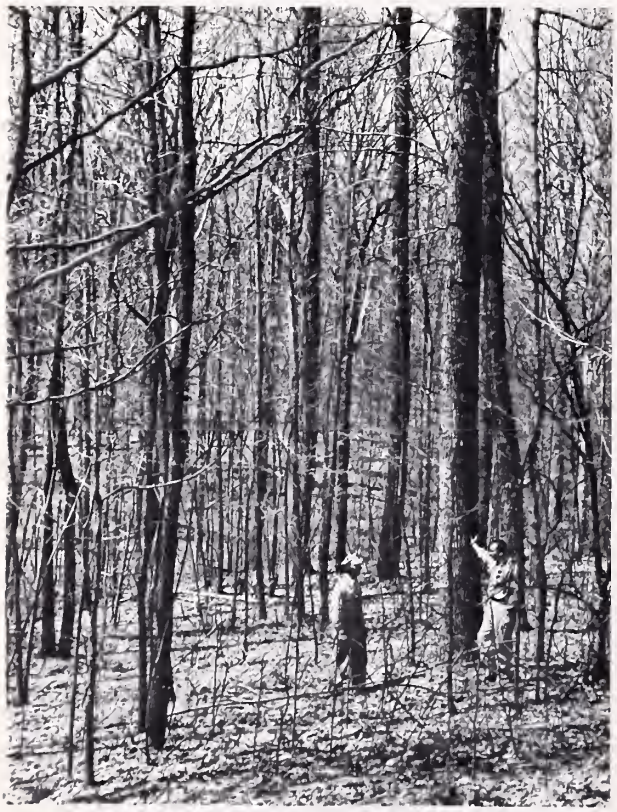

Figure 11. — A State Service Forester giving timber management assistance to a private woodland owner in Indiana. (Photo courtesy of Indiana Department of Natural Resources.)

Holdings that small usually do not generate much income for their owners, nor does their size justify the owner spending much money for timber stand improvement. Also, these landowners are not easily persuaded to practice forest management because of the long rotations required to grow trees to large sawtimber size and hence the long wait for financial return. These are important reasons why much of Indiana's forest land is not managed more intensively.

Most of the publicly owned forest is State (146 thousand acres) or National Forest (137 thousand acres) land. Smaller areas are owned by other Federal agencies and by counties and municipalities. This ownership pattern has changed little between surveys, except that State and National Forest lands have increased somewhat.

Sawtimber Stands Constitute Half the Commercial Forest Area

Sawtimber stands make up more than half the total commercial forest area. Between 1950 and 1967 the area of sawtimber stands remained almost the same. However, the poletimber area went down and the sapling and seedling area went up substantially (table 2).

Although two-thirds of all timber stands in Indiana are less than 70 years old, poor growth in older stands has resulted in average growth below the level normally expected from such young trees.

Table 2. — *Comparison of 1950 and 1967 commercial forest land area by stand-size class, Indiana*

Stand-size class	1950 area		1967 area	
	M acres	Percent	M acres	Percent
Sawtimber	2,084	51	2,037	52
Poletimber	1,337	33	866	22
Sapling & seedling	600	15	925	24
Nonstocked areas	61	1	68	2
All classes	4,082	100	3,896	100

Overall Stocking of Trees Is High

Stocking of sound, live trees in Indiana is high — in fact, more than half of the commercial forest is well-stocked or overstocked with these trees. Only 68,000 acres are less than 10 percent stocked and thus require planting, seeding or other treatment to make them productive.

In contrast, the stocking of "desirable" trees[6] — those healthy, vigorous, well-formed trees that are most likely to produce valuable products and survive to maturity — is very poor. Seventy percent of the commercial area is less than 10 percent stocked with desirable trees.

Site index[7] provides a rough measure of forest land productivity, because the most productive land generally grows the tallest trees at an index age (50 years in this report). Although site index varies widely by species, forest land in the Midwest can generally be described as follows:

Site index class	*Description*
55 or less	Poor site
56 to 70	Average site
More than 70	Good site

Site index measurements showed 60 percent of Indiana's commercial forest land to be capable of growing trees 70 feet and taller at age 50, and 95 percent to be capable of growing trees 50 feet and taller. The percent of area in each site index class for each of the three most extensive forest types in Indiana is as follows:

Site index class	*Oak-hickory*	*Maple-beech-birch*	*Elm-ash-cottonwood*
90-100	11	12	19
80- 90	19	18	27
70- 80	28	31	25
60- 70	23	25	25
50- 60	13	11	4
40- 50	5	3	0
30- 40	1	0	0
	100	100	100

PRESENT TIMBER USE

The harvest and manufacture of wood products provides substantial employment in Indiana. During 1963, the lumber, millwork, veneer, wooden container, wood preserving, furniture, paper, and allied industries employed 45,200 persons, or 7.4 percent of the State's manufacturing work force. Payroll of the timber-based industries in 1963 was $221 million, and value added by manufacture (the difference between the cost of goods purchased by an enterprise and the value of the product it sells) amounted to $406 million in 1963[8].

Total output of timber products in 1966 was 60.4 million cubic feet, including 51.1 million cubic feet of roundwood and 9.3 million cubic feet of plant residues. This represents a small decline from the 57.8 million cubic feet of roundwood output in 1949 (no estimate of plant residues was made in 1949). Growing-stock trees provided 93 percent of the roundwood volume. Logs and bolts harvested in 1966 were worth an estimated $17 million at local points of delivery.

Hardwoods accounted for practically all of the 64.9 million cubic feet of timber removals from growing stock in 1966. The hardwood removals volume was 39 percent greater than in 1949. Trees cut for products made up most of the hardwood removals (57.8 million cubic feet); the remainder of the removals came from changes in land use, land clearing, and cultural operations such as timber stand improvement. The following tabulation compares timber removals in 1950[9] and 1966 (in thousand cubic feet):

Removals	*1950*	*1966*
Hardwoods	46,320	64,500
Softwoods	151	400
Total	46,471	64,900

No single species constituted more than 11 percent of the volume of growing stock cut for products, although the red oak group (principally northern red and black oak) accounted for one-fourth of the cut. Other important species, in descending order of volume cut, were white oak, hard maple, soft maple, cottonwood, and yellow-poplar.

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[6] *Trees are classed by Forest Survey as either desirable, acceptable, rough, rotten, or short sawtimber. See Appendix for definitions.*

[7] *Site index is the height in feet of average dominant or codominant trees at a specified age (50 years in this case). For example, "site index 60" means that the height of dominant or codominant trees in the area averages 60 feet at age 50.*

[8] *Source: 1963 Census of Manufactures, U.S. Dep. Commerce, Bureau of Census.*

[9] *1950 timber removals did not include volume from "other removals," but 1966 timber removals does include this volume. "Other removals" includes growing-stock trees removed in cultural operations such as stand improvement, land clearing, and changes in land use.*

Indiana's primary wood-using plants — mostly sawmills — are concentrated in the South (fig. 12), where 66 percent of the timber-products volume was harvested in 1966. The number of active, primary wood-using plants declined from 1,149 in 1949 to 518 in 1966. Most of the plants that ceased operations were small sawmills.

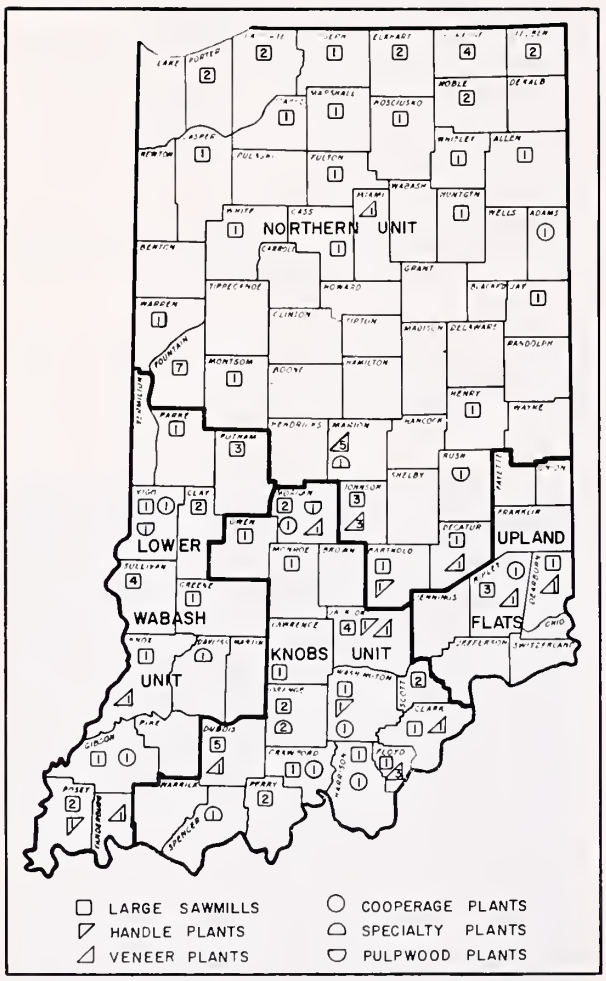

Figure 12. — Primary wood-using plants in Indiana, 1966. Number in symbol indicates number of plants in county. Large sawmills are those cutting over 1 million board feet.

Saw-Log Production Climbing

Saw logs and bolts accounted for two-thirds of the timber-products output from growing stock in 1966. Loggers harvested 223 million board feet of saw logs, of which only 7 million board feet were shipped from Indiana to other States, namely Illinois, Kentucky, Ohio, and Michigan. The saw-log harvest was 38 percent greater than in 1949.

Saw logs and bolts accounted for 54 percent of the total timber products output (from growing stock, nongrowing stock and plant residues) in 1966 (fig. 13).

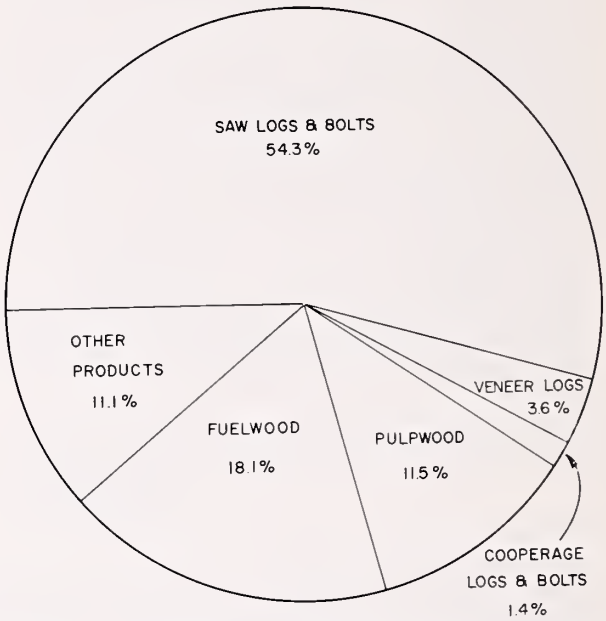

Figure 13. — Distribution of total timber products output (60,358 thousand cubic feet) in Indiana, 1966.

From a peak of slightly more than 1 billion board feet at the turn of the century, Indiana lumber production fell off to a depression-period low of 70 million in 1932, and then slowly increased to 178 million in 1966 (fig. 14). Nearly all lumber manufactured in

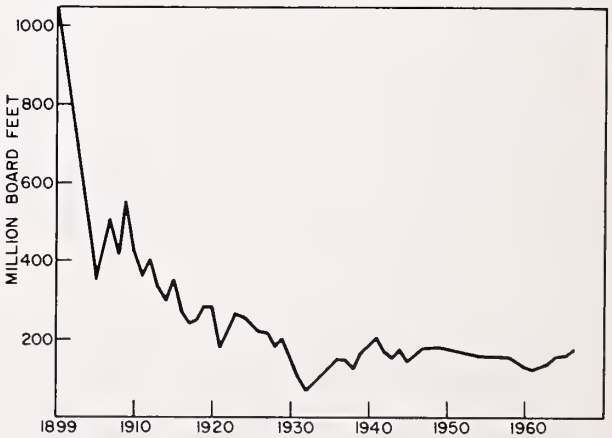

Figure 14. — Lumber production in Indiana, 1899 to 1966 (Sources: Lumber production in the United States 1799-1946, U.S. Dep. Agr. Misc. Public. 669, 1948; Lumber production and mill stocks, Annu. Rep. U.S. Dep. Com. Bur. Census, Annu. Reports: 1947, 1949, 1954, 1958, 1960-66).

1966 was hardwood, and more than one-quarter of it was red oak (includes black oak). Other species from which large amounts of lumber were sawn are white oak, hard maple, yellow-poplar, soft maple, and walnut. In 1949, 1,100 sawmills were operating in Indiana but by 1966 the number of active mills dwindled to 480.

Sixteen counties — Crawford, Decatur, Dubois, Elkhart, Fountain, Jackson, La Grange, La Porte, Lawrence, Morgan, Noble, Orange, Perry, Putnam, Ripley, and Sullivan — each produced more than 5 million board feet of lumber in 1966 and together accounted for 47 percent of all lumber production.

Pulpwood Harvest Shows Rapid Gain Since 1949

The harvest of round pulpwood from growing stock was second in volume only to the harvest of saw logs and bolts in 1966 (fig. 15). The 94 thousand

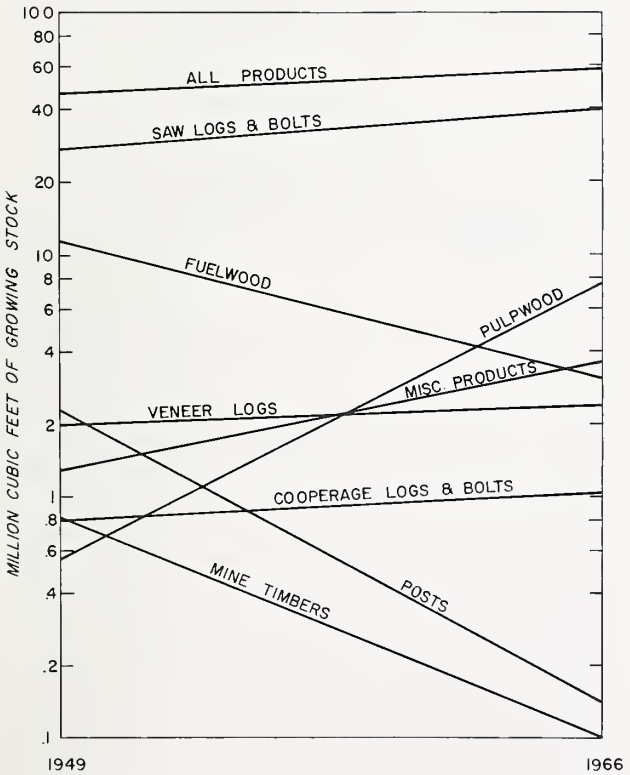

Figure 15. — Comparison of 1949 and 1966 growing-stock volume cut for products.

cords of round pulpwood cut in 1966 is a big increase over the 9 thousand cords cut in 1949, although pulpwood cut has remained fairly constant since 1962 when 87 thousand cords were harvested. Most of the 1966 harvest was used in Indiana, but some of it was used by pulpmills in Illinois, Michigan and Ohio. In addition to round pulpwood, a small amount of hardwood sawmill residues was pulped.

Indiana's two pulpmills have a daily capacity of 370 tons[10] of semichemical pulp, which is used primarily for corrugated paper. Part of their wood came from Illinois and Kentucky in 1966. Because the possibilities for pulping hardwoods have greatly expanded, Indiana's pulpwood cut will probably grow rapidly in the future.

Veneer-Log Output Rises

Indiana's 1966 veneer-log output of 16.3 million board feet led all the Central States[11] and constituted 43 percent of their production. The Indiana output was up 40 percent from that of 1949. Forty-two percent of the 1966 veneer-log volume was black walnut and 15 percent was yellow-poplar. The bulk (88 percent) of the volume was used for face and commercial grade veneers, and the remainder for container veneer. The majority of veneer logs cut, therefore, were of high quality and high value. Veneer logs represented one-fourth of the value (at local delivery points) of all timber products cut in 1966, even though veneer-log volume was only 4 percent of the total output.

The 21 veneer mills in Indiana are located principally in the central and southern portions of the State. In 1966 they received 34 million board feet of logs, of which only 14 million board feet were harvested in Indiana. Other states, largely those surrounding Indiana, provided the rest of the veneer logs, except for about a half million board feet that came from Canada, South America, and Africa.

Because of increased competition from paper and plastic, the number of container veneer mills dropped from seven in 1949 to only three in 1966. The number of utility and face-veneer mills was the same in 1966 as in 1949 (18), although there may have been fluctuations in intervening years. Opportunities for expanding veneer production are limited by the shortage of veneer-grade logs in Indiana's standing timber.

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[10] *Source: Lockwood Trade Journal Co. Inc., Lockwood's Directory of the Paper and Allied Trades — 1968, 1704 p. 1967.*

[11] *Central States include Indiana, Iowa, Illinois, and Missouri in this report.*

Production of Cooperage Logs Declines, Handle Logs Stabilizes

Cooperage-log output has been declining since it reached a peak of 6.9 million board feet in 1960. Output in 1962 was 6.2 million board feet, and by 1966 it had dropped to 5.3 million board feet. The cooperage industry is sustained by a law that prohibits reuse of barrels for aging bourbon whiskey. The seven active cooperage mills in the State cut 5.8 million board feet of bolts in 1966. This was down from the 7.0 million board feet cut in 1962, but more than double the volume cut in 1952.

The 1966 handle-log and-bolt harvest was 3.3 million board feet, slightly below the 1962 cut. Practically all of this volume was used by Indiana tool handle plants. In becoming the leading consumer of handle logs and bolts among the Central States, Indiana's four handle plants used 5.6 million board feet of material in 1966. This was 1.5 million board feet more than seven plants consumed in 1962. Ash accounted for half the volume, and hickory and hard maple made up the rest.

Large Declines In Use of Fuelwood, Posts, and Mine Timbers

Important changes in the needs of rural dwellers over the last 20 years have sharply curtailed the production and use of fuelwood and posts in Indiana and all across the Nation. In 1949 fuelwood led all other timber products in volume of roundwood cut in the State, with 27.6 million cubic feet. In 1966 the cut was only 5.5 million cubic feet. Post production fell even more rapidly — from more than 4 million posts cut in 1949 to only 200,000 in 1966.

The extensive shift from underground to strip coal mining in Indiana was largely responsible for the decline in mine timber production from 800 thousand cubic feet in 1949 to 100 thousand cubic feet in 1966.

Roundwood cut for miscellaneous products, mostly particleboard bolts, rose to 2.7 million cubic feet in 1966, a 50 percent increase over the 1949 harvest. In addition, 3.7 million cubic feet of plant residue was used for livestock bedding, mulch, small dimension stock, and specialty items.

THE FUTURE TIMBER RESOURCE

Growth and Removals Projected To Rise

A 30-year projection finds Indiana's growing-stock removals and net growth closer together in 1997 than in 1966, but sawtimber removals and net growth farther apart (fig. 16).

Projections are useful because they provide a look at what might logically happen to the timber resource in light of present and expected levels of growth, removals, stand conditions, and commercial forest land area. Management of a long-lived crop, such as timber, requires a long-range view of the resource. However, the assumptions used in making any projection may not hold true for long in a fast-changing world like ours. Therefore, the projections presented here will probably be most useful in evaluating the timber situation over the next decade.

Growing-stock removals are projected at 102 million cubic feet in 1997, up 58 percent from the 65 million cubic feet removed in 1966. Growth on growing stock, which is presently substantially higher than removals, is projected to remain higher and to nearly parallel removals during the last decade of the projection period. Net growth is expected to increase from 95 million cubic feet in 1966 to 123 million cubic feet in 1997. The continuing surplus of growth over removals will build the inventory of growing stock, but the rate of increase will lessen over time. When the level of utilization increases to the point where growth and removals remain equal, inventory will stabilize.

Although this projection shows an increase in growing-stock volume over the next 30 years, the forest is capable of producing much more. Growth averaged 24 cubic feet per acre in 1966 — 2 cubic feet less than in 1950. The growth in both these years was less than half of the present growth capacity of the forest. As mentioned earlier, approximately two-thirds of the commercial forest area is capable of

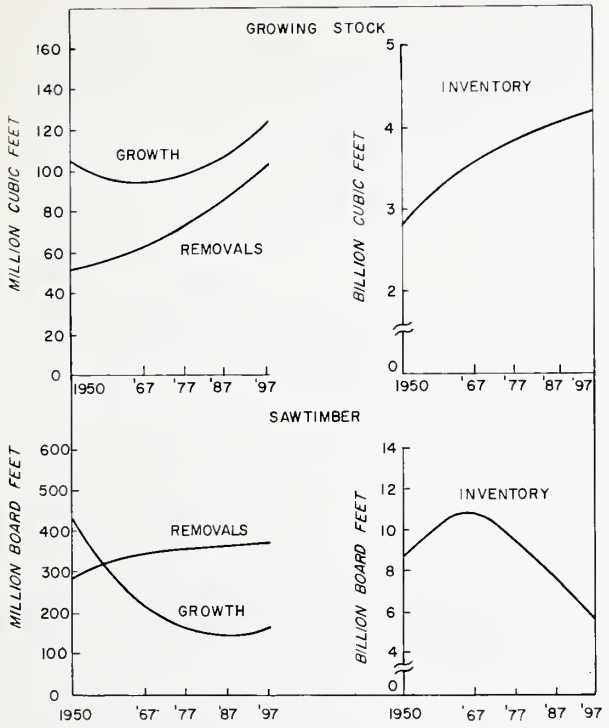

Figure 16. — Removals, net growth, and inventory of growing stock and sawtimber in Indiana, 1950 and 1967, and projections for 1977-1997. (Timber removals in 1950 were adjusted to make them comparabel with timber removals for later years.)

producing between 50 and 85 cubic feet of wood per acre per year at present management levels and full stocking. And yields might be pushed even higher through fertilization and genetic improvement.

The sawtimber inventory, which increased between 1950 and 1967, is projected to drop to about half its 1967 level at the end of 30 years. Board-foot growth per acre in 1966 was about half of what it was in 1950, largely due to repeated high-grading of sawtimber stands. Growth on sawtimber trees, which amounted to only about two-thirds of sawtimber removals in 1966, is expected to decline further until the last decade of the projection period, when it may increase. The continuing excess of sawtimber removals over growth and resultant big decline of sawtimber inventory projected ahead are matters for concern.

For purposes of projection it was assumed that the area of commercial forest land in Indiana will decline from 3.9 million acres in 1967 to about 3.0 million acres in 1997. Other assumptions used in making the above projections are found in a footnote to table 62 in the Appendix.

Removal of Allowable Cut Would Improve Growth

In contrast to the above picture of what could happen to the forest resource if present trends continue, it may be useful to consider the kind of management that would lead to a more productive forest. If the growth potential of the forest land is to be realized, the many defective, slow-growing stands will have to be replaced by young, vigorous stands. There are an estimated 857,000 acres of commercial forest in need of harvest cutting over the next 10 years, many of which support stands that are past peak productivity. The area suggested for harvest cutting annually during the next decade by forest-type group is as follows:

Forest-type group	*Annual area of harvest cut* (acres)
Pine	700
Upland hardwoods	68,079
Lowland hardwoods	16,942
Total	85,721

In addition to this area, the annual allowable cut figures discussed in the following paragraphs already include the volume from intermediate cuts on about 2,100 acres per year. This is the area estimated in need of thinning annually to reduce stocking of overstocked stands to desirable levels; it is not a measure of total stand improvement work that could be done in the State.

The annual allowable cut for Indiana's commercial forest between 1967 and 1976 is estimated to be 116 million cubic feet, including 421 million board feet in sawtimber trees. As mentioned earlier, the 1966 timber removals of 65 million cubic feet of growing stock and 345 million board feet of sawtimber fall short of the allowable amount. The greatest imbalance between allowable cut and actual removals is in the poletimber portion of growing stock. With the exception of cottonwood and black walnut, most major species can sustain heavier growing-stock removals (fig. 17). Sawtimber harvest of these two species and yellow-poplar also exceeded allowable cut, although the reverse was true for most other species.

If the full allowable cut of growing stock were removed annually beginning in 1967, projections show that growing-stock inventory might decline slightly for the first decade and then climb sharply, as the accelerating growth exceeded removals (fig. 18). By about 1983 inventory would probably be back to its 1967 level, at which time inventory could be

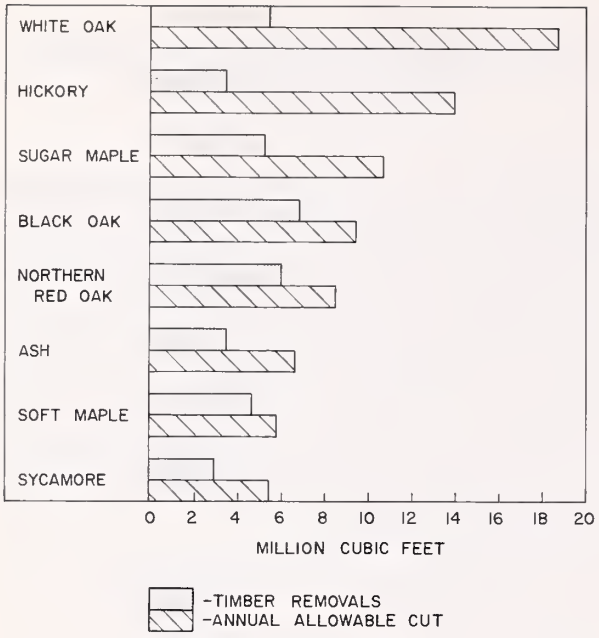

Figure 17. — Comparison of growing-stock timber removals and annual allowable cut for some major species in Indiana, 1966.

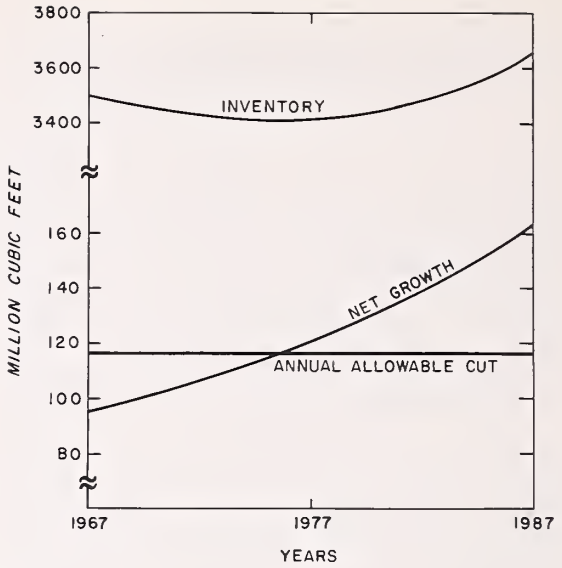

Figure 18. — Projections of growing-stock volume and growth, assuming the recommended allowable cut is removed.

stabilized by raising removals to equal growth, or increased by holding removals below growth.

The sawtimber allowable cut, which is nearly double present growth, is recommended for only the next decade. If the full allowable cut were removed during each of the next 10 years, it would have to be reduced in 1977 to around the level of removals reported in 1966 (345 million board feet), in order to prevent depleting stocking in the larger diameter classes. A relatively high initial cut is desirable to harvest stands that are beyond rotation age.

OUTLOOK

The projections presented in the preceding section afford a broad look into the possible future of Indiana's timber resource. This section of the report focuses on some of the specific changes that might take place during the next three decades.

Black walnut will undoubtedly be managed much more intensively than ever before. Demand for large-diameter, high-quality walnut veneer and saw logs both nationally and in Indiana, is high and will go higher as the supply continues to dwindle. Indiana's black walnut, which makes up 7 percent of the Nation's total black walnut sawtimber volume, is largely owned by farmers and is found mostly as occasional trees in hardwood stands, pastures, and along fence rows.

In the past, black walnut management consisted primarily of harvesting high-grade, old growth trees. But today enough is known about walnut culture to suggest that landowners investing in selected trees on good sites or in walnut orchards might realize reasonable returns from growing these trees. Because fast-grown walnut wood is equal or superior in machining qualities to slow-grown wood, such intensive cultural practices as pruning, fertilization, and release of individual trees are desirable, especially in the early growth stages.

The Nation's growing need for hardwood saw logs augurs well for Indiana's hardwood forests. The cut of hardwood sawtimber in the northern United States, where much of the hardwood volume is found, is projected to triple between 1962 and 2000.[12]

[12] *Source: U.S.D.A. Forest Service. Timber trends in the United States. Forest Resource Rep. 17, 235 p. 1965.*

Opportunities to market hardwood logs in Indiana should improve — especially for high-quality logs. However high-quality trees will be in increasingly high demand but in short supply unless timber stand improvement work, which has been largely ignored to date, is undertaken widely. At present there is little to suggest that private individuals, who own most of Indiana's commercial forest, will be more inclined to invest in cultural work in the future than they were in the past.

Some reason for optimism, however, is offered by the improved pulping technology that now permits use of short-fibered hardwoods for pulpwood. A growing market now exists for the poor-quality and excess small-diameter hardwood trees present in many stands, should landowners wish to make commercial thinnings. Past experience in other parts of the country, however, indicates that many landowners take advantage of such new markets by clearing pole-timber stands and selling the trees as pulpwood.

The use of wood chips seems assured of increasing, as evidenced by the installation of debarkers and chippers at even small sawmills in the State. In the future much of the chipping will probably be done in the woods with a new generation of mechanized equipment.

Continuing urban spread will force a changing pattern of land use. Many farm woodlots near expanding cities and towns will be converted to home lots, shopping centers, and other developments. Forest recreation is likely to increase in importance, especially in southern Indiana. Almost certainly forest landowners will pay increasing attention to the land's esthetic values, especially on lands devoted to recreation (fig. 19).

Forest landowners who desire further information on forest management or marketing of forest products may contact the Indiana Division of Forestry, 613 State Office Building, Indianapolis, Indiana 46204; the local County Extension Agent; or the U.S.D.A. Forest Service, State and Private Forestry, 6816 Market Street, Upper Darby, Pennsylvania 19082.

Figure 19. — Townsend Lake fishing pond on the Hoosier National Forest in Lawrence County, Indiana. Water and forests are two important ingredients in the accelerating boom in outdoor recreation in Indiana and throughout the Nation.

APPENDIX

Accuracy of Survey

The forest area and timber inventory estimates in this report are based on a carefully designed sample of Indiana's forests. Since neither every acre nor every tree in the State was measured, the reported figures are best estimates. A measure of the reliability of these estimates is given by a sampling error. Following is an example of how sampling error is used.

The estimated area of commercial forest land in Indiana in 1967, 3,895.8 thousand acres, has a sampling error of ± 2.02 percent (78.7 thousand acres). If there were no errors in procedure, the odds are 2 to 1 that if we repeated the survey in the same way, the new estimate would be between 3,974.5 and 3,817.1 thousand acres (3,895.8 ± 78.7). Similarly, the odds are 19 to 1 that it would be within ± 157.4 thousand acres (78.7 x 2) of the present estimate.

Likewise, the sampling error for total volume of growing stock in Indiana is ± 3.08 percent; sampling error for net annual growth on growing stock is ± 5.58 percent; and sampling error for volume of timber cut from growing stock is ± 10.20 percent.

In addition, the resource statistics are subject to human errors (mistakes in judgment, recording, calculation, and compilation). These errors are minimized through close supervision and careful training of employees and by rechecking all phases of the work.

As area, volume, growth, and cut figures are broken down by county, forest type, species, ownership, and diameter classes, sampling errors increase — the smaller the unit the higher the sampling error. The following guide may be used in approximating the sampling error for smaller units of measure:

Sampling error (Percent)	*Commercial forest land* (Thousand acres)	*Cubic-foot volume* (Million cu. ft.)	*Cubic-foot growth* (Million cu. ft.)	*Cubic-foot timber cut* (Million cu. ft.)
2	3,974	.....	.....	.....
3	1,766	3,692	.....	.....
4	994	2,077	.....	.....
5	636	1,329	118	.....
10	159	332	30	60
15	71	148	13	27
20	40	83	7	15
25	25	53	5	10
50	6	13	1	2
100	2	3	([1])	1

[1] *Less than 500,000 cubic feet.*

Survey Procedure

Area, Volume, and Growth

A total of 178,516 points on aerial photos representing a systematic sample of all lands in Indiana was observed. These points were classified as either forest land (35,653 points) or nonforest land (142,863) points) in order to make a preliminary estimate of forest area. Of the forest points, 11,777 were stereo-classified by county as to forest type, stand-size class, and density. A total of 1,226 points classed as forest land and 4,727 points classed as nonforest land was examined on the ground to correct for errors in classification and for actual changes in land use since the photos were taken. At each of the 1,020 commercial forest land locations, 10 variable-radius plots (37.5 basal area factor) were established uniformly over a sample acre. Measurements taken were used to compute volume and growth estimates. Each of these locations was carefully marked for remeasurement during the next survey.

Timber Cut

Timber-cut estimates for 1966 were obtained by canvassing all sawmills, veneer mills, pulpmills and other wood-using industries in Indiana. The cut of fuelwood and fence posts was estimated using 1964 Bureau of Census data.

Allowable Cut

Allowable cut is the volume of timber on commercial forest land that could be cut annually for the next 10 years, while improving tree stocking and bringing about a more even distribution of age classes. It includes one-tenth of the volume in stands that would reach or exceed rotation age during the next 10 years. It also includes stand-improvement cuts (partial cuts) in young pole or sawtiinber stands. Stands selected for harvest cuts or cultural operations had to have a yield of at least 3 cords per acre to be included in the allowable cut.

Allowable cut is based on the assumptions that all timber will be available and accessible when needed, and that a ready market will exist for every species, size, and grade of material harvested. Further, it assumes that the proper sequence of cutting is known and will be followed, and that logging practices employed will result in an improved forest. Because

there is no way of guaranteeing that these assumptions will be valid over the next 10 years, the allowable cut estimates should be compared with timber removals figures only in a general way.

Comparisons Between Surveys

To evaluate the condition and trend of the forest resource, it is useful to compare the current inventory with data from the previous inventory. For the comparison to be valid, however, procedures and definitions for each inventory must be consistent. For example, the use of different volume tables in successive surveys could result in totally irrelevant conclusions about the trend between surveys.

To make a consistency check, we add to the previous inventory volume the net growth that has accrued, and subtract the timber removals that occurred between surveys. The resulting volume should be close to the inventory volume calculated from the new survey data. Such a check of growing-stock volumes in Indiana produced satisfactory results. However, sawtimber inventory, growth, and mortality were not consistent.

An analysis of the board foot-cubic foot ratios used for the two surveys shows them to be significantly different. This does not imply that the first inventory is incorrect or invalid. The first inventory was as reliable as possible using the procedures available in 1950. The second inventory was based on newer and better procedures, and is therefore the most accurate. *For comparison purposes only,* adjustments of 1950 sawtimber inventory, growth and mortality volumes were necessary.

The adjustments were made by multiplying board foot-cubic foot ratios from the 1967 survey times the 1950 cubic-foot volumes of sawtimber trees. This resulted in a change of 1950 sawtimber volume from 11,010 million board feet (as published) to 8,736 million board feet. By applying the initial growth rate to the adjusted inventory volume, the 1950 volume of net growth on sawtimber trees was adjusted from 551 to 436 million board feet. Similarly, 1950 sawtimber mortality volume was adjusted from 19 to 15 million board feet by multiplying the initial mortality rate times the adjusted inventory volume. The above adjusted volumes are used whenever comparisons between surveys are made in this report.

Definition of Terms

Land-Use Classes

Gross area. — The entire area of land and water as determined by the Bureau of Census, 1960.

Land area. — The area of dry land and land temporarily or partially covered by water such as marshes, swamps, flood plains, streams, sloughs, and estuaries. Canals less than one-eighth mile wide, lakes, reservoirs, and ponds smaller than 40 acres are included as land area. These figures are from the Bureau of the Census, 1960.

Forest land. — Land at least 10 percent stocked by forest trees of any size, or formerly having such tree cover, and not currently developed for nonforest use. The minimum forest area classified was 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas were classed as forest if less than 120 feet in width.

Commercial forest land. — Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. Includes accessible and inaccessible areas suitable for growing crops of industrial wood generally exceeding 20 cubic feet per acre of annual growth.

Noncommercial forest land. — (a) Unproductive — forest land incapable of yielding crops of industrial wood because of adverse site conditions. (b) Productive-reserved — productive public forest land withdrawn from commercial timber use through statute or administrative regulation.

Nonforest land. — Land that has never supported forests, and lands formerly forested where forest use is now precluded by development for nonforest-uses, such as cropland, improved pasture, residential areas, and city parks. Also includes improved roads and adjoining rights-of-way, powerline clearings, and certain areas of water classified by the Bureau of Census as land. Unimproved roads, streams, canals, and nonforest strips in forest areas must be more than 120 feet wide, and clearings in forest areas must be more than 1 acre in size, to qualify as nonforest land.

Ownership Classes

National Forest. — Federal lands that have been designated as National Forests or purchase units, and other lands under the administration of the Forest Service.

Miscellaneous Federal. — Lands owned or administrated by the Federal Government.

State, county, and municipal. — Lands owned by states, counties, or municipalities, or lands leased by them for more than 50 years.

Forest industry. — Lands owned by companies or individuals operating wood-using plants.

Farmer-owned. — Lands owned by operators of farms. A farm must include 10 or more acres from which the sale of agricultural products totals $50 or more annually or, if less than 10 acres, the yield must be at least $250 annually.

Miscellaneous private. — Privately owned lands other than forest-industry or farmer-owned.

Stand-Size Classes

Sawtimber stands. — Stands at least 10 percent stocked with growing-stock trees, with half or more of this stocking in sawtimber or poletimber trees and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands. — Stands at least 10 percent stocked with growing-stock trees, and with half or more of this stocking in sawtimber and/or poletimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands. — Stands at least 10 percent stocked with growing-stock trees and with sapling and/or seedlings comprising more than half of the stocking.

Nonstocked land. — Commercial forest land less than 10 percent stocked with growing-stock trees.

Stocking

The degree of occupancy of land by trees, measured in terms of basal area and/or the number of trees required to utilize fully the growth potential of the land. The actual stocking at a point was evaluated against a stocking standard of 80 square feet of basal area per acre for trees 5.0 inches d.b.h. and larger, or its equivalent in numbers of trees per acre for seedlings and saplings.

Forest-Type Groups

Loblolly-shortleaf pine. — Forests in which loblolly, shortleaf, and Virginia pines, singly or in combination, comprise a plurality of the stocking. In Indiana this type occurs principally as plantations of shortleaf and loblolly pine and as natural stands of Virginia pine. (Common associates include gum, hickory, sassafras, and yellow-poplar.) The small area of the white-red-jack pine type has been combined in this report with the loblolly-shortleaf type. The former includes forests in which eastern white pine, red pine, or jack pine, singly or in combination, comprise a plurality of the stocking. (Common associates include hemlock, aspen, birch, and maple.)

Oak-pine. — Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking, but in which southern pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, sassafras, and yellow-poplar.)

Oak-hickory. — Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, black walnut, black locust, and catalpa.)

Oak-gum-cypress. — Bottomland forests in which tupelo, blackgum, sweetgum, oaks, or southern cypress, singly or in combination, comprise a plurality of the stocking except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates includes cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-cottonwood. — Lowland forests in which elm, ash, cottonwood, or soft maple, singly or in combination, comprise a plurality of the stocking. (Common associates include willow, sycamore, and beech.)

Maple - beech - birch. — Upland forests in which hard maple or beech, singly or in combination, comprise a plurality of the stocking. (Common associates include elm, basswood, and soft maple.)

Aspen-birch. — Forests in which aspen, balsam poplar, paper birch, or gray birch, singly or in combination, comprise a plurality of the stocking. (Common associate is soft maple.)

Site-Quality Classes

A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands. Five site-quality classes were used — sites capable of producing the following cubic-foot volumes of wood annually:

165+
120 to 165
85 to 120
50 to 85
20 to 50

Site Index

An expression of forest site quality based on the height of free-growing dominant or codominant trees of a representative species in the forest type at age 50.

Stand Age

Age of the main stand.

Area Condition Classes

Classification of commercial forest land based on stocking of desirable trees and other cover conditions affecting current and prospective timber growth.

Class 10. — Areas 100 percent or more stocked with desirable trees but not overstocked. Stands do not require immediate treatment to maintain a high level of growth.

Class 20. — Areas 100 percent or more stocked with desirable trees, but overstocked with all live trees. Stands require thinning to produce maximum growth of desirable trees.

Class 30. — Areas 60 to 100 percent stocked with desirable trees, and with less than 30 percent of the area controlled by acceptable growing-stock trees, cull trees, inhibiting vegetation, slash, or nonstockable conditions. Stands have conditions favorable for natural improvement of stocking without special treatment.

Class 40. — Area 60 to 100 percent stocked with desirable trees and with 30 percent or more of the area controlled by other trees or conditions that prevent occupancy by desirable trees. Stands need special treatment such as thinning or cull-tree removal to improve desirable-tree stocking.

Class 50. — Area less than 60 percent stocked with desirable trees, but 100 percent or more stocked with growing-stock trees. Stands need special treatment to improve desirable-tree stocking. Stands that have almost reached rotation age would usually not be treated.

Class 60. — Areas less than 60 percent stocked with desirable trees, but 60 to 100 percent stocked with growing-stock trees. Stands need special treatment to improve desirable-tree stocking.

Class 70. — Areas less than 60 percent stocked with desirable trees and less than 60 percent stocked with growing-stock trees. Stands need treatment to improve desirable-tree or growing-stock tree stocking.

Tree Classes

Growing-stock trees. — Sawtimber trees, poletimber trees, saplings and seedlings. That is, all live trees except rough and rotten trees.

Desirable trees. — Growing-stock trees having no serious defects in quality limiting present or prospective use, and of relatively high vigor and containing no pathogens that may result in death or serious deterioration before rotation age. These are trees that would be favored by forest management in silvicultural operations.

Acceptable trees. — Trees meeting the standards for growing stock but not qualifying as desirable trees.

Sawtimber trees. — Live trees of commercial species containing at least a 12-foot saw log. Softwoods must be at least 9.0 inches in diameter at breast height and hardwoods at least 11.0 inches.

Poletimber trees. — Live trees of commercial species at least 5.0 inches in diameter at breast height but smaller than sawtimber size, and of good form and vigor.

Saplings. — Live trees of commercial species 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

Seedlings. — Live trees of commercial species less than 1.0 inch in diameter at breast height that are expected to survive according to regional standards.

Rough trees. — Live trees that do not contain at least one merchantable 12-foot saw log, now or prospectively, because of roughness, poor form, or noncommercial species.

Rotten trees. — Live trees of commercial species that do not contain a merchantable 12-foot saw log, now or prospectively, because of rot.

Short-log trees (rough trees). — Trees that contain one or more 8- to 11-foot saw logs that would qualify as growing stock except for the 12-foot log requirement. The net volume of these trees is shown separately from growing stock.

Diameters

Diameter at breast height (d.b.h.). — Tree diameter in inches, outside bark, measured at 4½ feet above ground.

Diameter classes. — The 2-inch diameter classes extend from 1.0 inch below to 0.9 inch above the stated midpoint. For example, the 6-inch class contains trees 5.0 to 6.9 inches d.b.h.

Timber Volume

Volume of growing stock. — The volume of sound wood in the bole of sawtimber and poletimber trees

from stump to a minimum 4.0-inch top diameter outside bark, or to the point where the central stem breaks into limbs. Growing-stock volumes are shown in cubic feet but may be converted into solid-wood cords by dividing by 79.

Volume of sawtimber. — Net volume of the saw log portion of live sawtimber trees in board feet, International ¼-inch rule, from stump to a minimum 7 inches top diameter outside bark for softwoods and 9 inches for hardwoods.

Upper stem portion. — That part of the bole of sawtimber trees above the merchantable sawtimber top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Quality Classes

Log grade. — Classification of logs based on external characteristics as indicators of quality. Hardwood species were graded in accordance with "Hardwood Log Grades for Standard Lumber," issued by the Forest Products Laboratory under the designation D 1737, 1953, and Forest Service standards for hardwood tie and timber logs. Shortleaf, loblolly, and other yellow pines were graded in accordance with "1953 Interim Log Grades for Southern Pine," October 1953, U.S.D.A. Forest Service. All other softwoods were graded in accordance with "Specifications for Log Grades of Hardwoods and Softwoods," Northern Hemlock and Hardwood Association, 1947.

Growth

Net annual growth of growing stock. — The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber. — The annual change in volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Mortality of growing stock. — The volume of sound wood in live sawtimber and poletimber trees dying annually from natural causes. Natural causes include fire, insects, disease, animal damage, weather, and suppression.

Mortality of sawtimber. — The net board-foot volume of sawtimber trees dying annually from natural causes.

Timber Removals

Timber removals include (1) the volume of sound wood in growing-stock trees harvested for forest products, (2) the logging residues resulting from harvesting, and (3) other removals.

Logging residues are the unused portions of growing-stock trees cut or killed by logging. Other removals consist of growing-stock trees removed by cultural operations such as stand improvement, and by land clearing and changes in land use.

Timber products output. — All timber products cut from roundwood, and byproducts of wood-manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees of noncommercial species, sapling-size trees, and limbwood on forest and nonforest land.

Principal Tree Species of Indiana[13]

SOFTWOOD SPECIES

Shortleaf and loblolly pine:
- Shortleaf pine — *Pinus echinata*

Other yellow pines:
- Virginia pine — *Pinus virginiana*

Eastern white and red pine group:
- Red pine — *Pinus resinosa*
- White Pine — *Pinus strobus*

Baldcypress — *Taxodium distichum*

Other eastern softwood group:
- Eastern redcedar — *Juniperus virginiana*
- Tamarack — *Larix laricina*
- Scotch pine — *Pinus sylvestris*

HARDWOOD SPECIES

Select white oaks:
- White oak — *Quercus alba*

Other select white oak group:
- Swamp white oak — *Quercus bicolor*
- Bur oak — *Quercus macrocarpa*
- Swamp chestnut oak — *Quercus michauxii*
- Chinkapin oak — *Quercus muehlenbergii*

Select red oaks:
- Northern red oak — *Quercus rubra*

Other select red oak group:
- Cherrybark oak — *Quercus falcata* var. *pagodaefolia*
- Shumard oak — *Quercus shumardii*

Other white oak group:
- Chestnut oak — *Quercus prinus*
- Post oak — *Quercus stellata*

Other red oaks:
- Black oak — *Quercus velutina*

Other red oak group:
- Scarlet oak — *Quercus coccinea*
- Southern red oak — *Quercus falcata*
- Shingle oak — *Quercus imbricaria*
- Pin oak — *Quercus palustris*

Hickory group:
- Mockernut hickory — *Carya tomentosa*
- Shagbark hickory — *Carya ovata*
- Shellbark hickory — *Carya laciniosa*
- Pecan — *Carya illinoensis*
- Pignut hickory — *Carya glabra*
- Bitternut hickory — *Carya cordiformis*
- Hard maple — *Acer saccharum*

Soft maple group:
- Red maple — *Acer rubrum*
- Silver maple — *Acer saccharinum*
- Boxelder — *Acer negundo*

Beech — *Fagus grandifolia*

Sweetgum — *Liquidambar styraciflua*

Tupelo and blackgum:
- Swamp tupelo — *Nyssa sylvatica* var. *biflora*

Ash group:
- White ash — *Fraxinus americana*
- Black ash — *Fraxinus nigra*
- Green ash — *Fraxinus pennsylvanica*
- Blue ash — *Fraxinus quadrangulata*

Cottonwood and aspen:
- Cottonwood — *Populus deltoides*

Aspen group:
- Balsam poplar — *Populus balsamifera*
- Bigtooth aspen — *Populus grandidentata*
- Quaking aspen — *Populus tremuloides*

American basswood — *Tilia americana*

Yellow-poplar — *Liriodendron tulipifera*

Black walnut — *Juglans nigra*

Black cherry — *Prunus serotina*

Elm group:
- Winged elm — *Ulmus alata*
- American elm — *Ulmus americana*
- Siberian elm — *Ulmus pumila*
- Slippery elm — *Ulmus rubra*
- Rock elm — *Ulmus thomasii*

American sycamore — *Platanus occidentalis*

Other eastern hardwood group:
- Yellow birch — *Betula alleghaniensis*
- River birch — *Betula nigra*
- Paper birch — *Betula papyrifera*
- Ohio buckeye — *Aesculus glabra*
- Hackberry — *Celtis occidentalis*
- Northern catalpa — *Catalpa speciosa*
- Flowering dogwood — *Cornus florida*
- Common persimmon — *Diospyros virginiana*
- Honeylocust — *Gleditsia triacanthos*
- Kentucky coffeetree — *Gymnocladus dioicus*
- Butternut — *Juglans cinerea*
- Osage-orange — *Maclura pomifera*
- Cucumbertree — *Magnolia acuminata*
- Black locust — *Robinia pseudoacacia*
- Black willow — *Salix nigra*
- Sassafras — *Sassafras albidum*

[13] *The common and scientific names are based on "Check List of Native and Naturalized Trees of the United States (Including Alaska)" by Elbert L. Little, Jr., U.S. Dep. Agr., Agr. Hanb. 41, 472 p. 1953.*

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62. Removals, net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Indiana, 1967, and projections for 1977, 1987, and 1997

Table 3. — *Area by land classes, Indiana, 1967*

Land class	:Thousand : acres
Forest land:	
Commercial	3,895.8
Productive-reserved	38.5
Unproductive	30.0
Total	3,964.3
Nonforest land:	
Cropland 1/	13,317.2
Pasture and range	3,454.7
Other 2/	2,424.9
Total	19,196.8
Total area 3/	23,161.1

1/ Source: 1964 Census of Agriculture

2/ Includes swampland, industrial and urban areas, other nonforest land, and 72,500 acres, classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.

3/ Source: U.S. Bureau of the Census, Land and Water Area of the United States, 1960.

Table 4. — *Area of commercial forest land, by ownership classes and Forest Survey Units, Indiana, 1967*
(Thousand acres)

Ownership class	All units	Lower Wabash	Knobs	Upland Flats	Northern
National Forest	136.6	8.2	128.4	-	-
Other Federal:					
Bureau of Land Management	-	-	-	-	-
Indian	-	-	-	-	-
Miscellaneous Federal	77.3	49.5	7.0	-	20.8
Total other Federal	77.3	49.5	7.0	-	20.8
State	146.0	12.4	120.2	1.0	12.4
County and municipal	1.0	-	-	-	1.0
Forest industry 1/	21.8	1.0	17.7	.3	2.8
Farmer-owned	2,661.4	500.1	1,090.7	314.3	756.3
Miscellaneous private	851.7	265.0	405.2	38.1	143.4
All ownerships	3,895.8	836.2	1,769.2	353.7	936.7

1/ No farmer-owned and miscellaneous private lands were leased to forest industry.

Table 5. — *Area of commercial forest land, by stand-size and ownership classes, Indiana, 1967*
(Thousand acres)

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Sawtimber stands	2,036.5	84.3	130.3	11.2	1,810.7
Poletimber stands	865.7	23.1	56.7	5.2	780.7
Sapling and seedling stands	925.3	22.4	37.2	5.4	860.3
Nonstocked areas	68.3	6.8	.1	-	61.4
All classes	3,895.8	136.6	224.3	21.8	3,513.1

Table 6. — *Area of commercial forest land, by stand-volume and ownership classes, Indiana, 1967*
(Thousand acres)

Stand volume per acre 1/ (board feet)	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Less than 1,500	1,682.4	46.8	94.6	8.9	1,532.1
1,500 to 5,000	1,427.7	74.9	84.8	8.3	1,259.7
More than 5,000	785.7	14.9	44.9	4.6	721.3
All classes	3,895.8	136.6	224.3	21.8	3,513.1

1/ International 1/4-inch rule.

Table 7. — *Area of commercial forest land, by stocking classes based on selected stand components, Indiana, 1967*
(Thousand acres)

Stocking percentage	Stocking classified in terms of-- All live trees	Growing-stock trees	Desirable trees
160+	-	-	-
150 to 160	15.0	1.2	-
140 to 150	33.0	4.5	-
130 to 140	170.9	27.2	-
120 to 130	376.8	51.5	-
110 to 120	608.1	197.3	-
100 to 110	688.2	339.8	-
90 to 100	752.5	393.0	-
80 to 90	466.6	537.9	-
70 to 80	322.2	587.4	-
60 to 70	185.1	497.5	3.4
50 to 60	113.3	394.0	12.6
40 to 50	58.1	302.2	84.8
30 to 40	56.7	181.4	152.2
20 to 30	21.8	199.2	368.6
10 to 20	22.5	113.4	565.1
Less than 10	5.0	68.3	2,709.1
All classes	3,895.8	3,895.8	3,895.8

Table 8. — *Area of commercial forest land, by area-condition and ownership classes, Indiana, 1967*
(Thousand acres)

Area-condition class	All ownership	National Forest	Other public	Forest industry	Farmer and miscellaneous private
Class 50 Less than 60% stocked with desirable trees, but 100% or more stocked with growing-stock trees.	621.5	25.0	52.7	4.1	539.7
Class 60 Areas less than 60% stocked with desirable trees, but 60 to 100% stocked with growing-stock trees.	2,015.8	95.1	119.8	12.3	1,788.6
Class 70 Areas less than 60% stocked with desirable trees and less than 60% stocked with growing-stock trees.	1,258.5	16.5	51.8	5.4	1,184.8
All classes	3,895.8	136.6	224.3	21.8	3,513.1

Table 9. — *Area of commercial forest land, by site and ownership classes, Indiana, 1967*
(Thousand acres)

Site class (cubic feet of growth per acre per year)	All ownerships	National Forest	Other public	Forest industry	Farmer and miscellaneous private
165 or more	8.4	-	-	-	8.4
120 to 165	23.3	-	2.6	0.1	20.6
85 to 120	161.9	1.4	5.5	.7	154.3
50 to 85	2,395.5	52.5	134.7	12.6	2,195.7
Less than 50	1,306.7	82.7	81.5	8.4	1,134.1
All classes	3,895.8	136.6	224.3	21.8	3,513.1

Table 10. — *Area of commercial forest land, by forest types and ownership classes, Indiana, 1967*
(Thousand acres)

Forest type	All ownerships	Public ownerships	Private ownerships
Loblolly-shortleaf pine	54.0	25.1	28.9
Oak-pine	46.0	8.3	37.7
Oak-hickory	2,388.8	270.5	2,118.3
Oak-gum-cypress	52.2	3.2	49.0
Elm-ash-cottonwood	553.7	21.4	532.3
Maple-beech-birch	788.0	32.4	755.6
Aspen-birch	13.1	-	13.1
All types	3,895.8	360.9	3,534.9

Table 11. — *Area of commercial forest land, by forest types and basal area classes, Indiana, 1967*
(Thousand acres)

Forest type	All classes	Basal area class (square feet per acre)									
		0-20	20-40	40-60	60-80	80-100	100-120	120-140	140-160	160-180	180+
Loblolly-shortleaf pine	54.0	10.9	14.7	5.0	6.7	7.6	2.7	6.4	-	-	-
Oak-pine	46.0	13.3	4.7	.5	13.8	9.5	-	4.2	-	-	-
Oak-hickory	2,388.8	187.3	199.2	396.8	718.4	502.2	243.7	131.9	-	9.3	-
Oak-gum-cypress	52.2	6.3	2.0	9.0	11.7	13.7	6.3	.4	-	-	2.8
Elm-ash-cottonwood	553.7	65.3	48.5	125.8	144.9	89.0	50.0	20.5	8.5	1.2	-
Maple-beech-birch	788.0	61.2	68.1	140.6	237.4	146.7	82.5	40.3	3.4	4.4	3.4
Aspen-birch	13.1	2.8	2.0	-	5.3	-	3.0	-	-	-	-
All types	3,895.8	347.1	339.2	677.7	1,138.2	768.7	388.2	203.7	11.9	14.9	6.2

Table 12. — *Area of commercial forest land, by forest types and site index classes, Indiana, 1967*
(Thousand acres)

Forest type	All sites	Site index class (height in feet at 50 years)						
		30-40	40-50	50-60	60-70	70-80	80-90	90-100
Loblolly-shortleaf pine	54.0	-	4.6	4.8	9.8	19.0	3.3	12.5
Oak-pine	46.0	-	16.7	6.3	15.3	4.6	3.1	-
Oak-hickory	2,388.8	15.7	122.6	319.9	552.3	679.6	447.5	251.2
Oak-gum-cypress	52.2	-	5.2	6.5	4.9	20.3	5.6	9.7
Elm-ash-cottonwood	553.7	-	3.7	21.5	136.6	138.5	148.1	105.3
Maple-beech-birch	788.0	-	26.1	89.9	192.5	246.2	141.5	91.8
Aspen-birch	13.1	-	-	-	-	2.8	6.0	4.3
All types	3,895.8	15.7	178.9	448.9	911.4	1,111.0	755.1	474.8

Table 13. — *Area of commercial forest land, by forest types, stand-size classes, and Forest Survey Units, Indiana, 1967*
(Thousand acres)

Forest type	All stands	Saw-timber stands	Pole-timber stands	Sapling and seedling stands	Non-stocked areas
All Units					
Loblolly-shortleaf pine	54.0	5.6	20.5	27.9	-
Oak-pine	46.0	7.4	16.4	22.2	-
Oak-hickory	2,388.8	1,233.8	560.6	572.3	22.1
Oak-gum-cypress	52.2	33.2	9.9	9.1	-
Elm-ash-cottonwood	553.7	303.8	102.3	118.2	29.4
Maple-beech-birch	788.0	452.7	147.7	170.8	16.8
Aspen-birch	13.1	-	8.3	4.8	-
All types	3,895.8	2,036.5	865.7	925.3	68.3
Lower Wabash Unit					
Loblolly-shortleaf pine	12.1	-	1.2	10.9	-
Oak-hickory	541.7	304.7	106.1	119.5	11.4
Oak-gum-cypress	14.7	11.0	3.7	-	-
Elm-ash-cottonwood	153.9	82.2	30.0	41.7	-
Maple-beech-birch	106.0	34.3	33.6	38.1	-
Aspen-birch	7.8	-	3.0	4.8	-
All types	836.2	432.2	177.6	215.0	11.4
Knobs Unit					
Loblolly-shortleaf pine	38.6	5.6	17.2	15.8	-
Oak-pine	46.0	7.4	16.4	22.2	-
Oak-hickory	1,262.0	614.8	311.6	335.6	-
Oak-gum-cypress	9.1	7.2	.8	1.1	-
Elm-ash-cottonwood	103.8	70.8	18.8	10.3	3.9
Maple-beech-birch	309.7	195.0	60.3	50.5	3.9
All types	1,769.2	900.8	425.1	435.5	7.8
Upland Flats Unit					
Oak-hickory	183.6	87.0	45.8	44.0	6.8
Oak-gum-cypress	12.7	4.7	-	8.0	-
Elm-ash-cottonwood	55.6	30.9	6.3	13.2	5.2
Maple-beech-birch	101.8	49.8	23.7	20.2	8.1
All types	353.7	172.4	75.8	85.4	20.1
Northern Unit					
Loblolly-shortleaf pine	3.3	-	2.1	1.2	-
Oak-hickory	401.5	227.3	97.1	73.2	3.9
Oak-gum-cypress	15.7	10.3	5.4	-	-
Elm-ash-cottonwood	240.4	119.9	47.2	53.0	20.3
Maple-beech-birch	270.5	173.6	30.1	62.0	4.8
Aspen-birch	5.3	-	5.3	-	-
All types	936.7	531.1	187.2	189.4	29.0

Table 14. — *Area of commercial forest land, by forest types and stand-age classes, Indiana, 1967*
(Thousand acres)

Forest type	All ages	Stand-age class (years)									
		0-40	40-50	50-60	60-70	70-80	80-90	90-100	100-120	120-140	140+
Loblolly-shortleaf pine	54.0	48.3	4.4	-	1.3	-	-	-	-	-	-
Oak-pine	46.0	33.6	2.0	0.5	-	4.2	5.7	-	-	-	-
Oak-hickory	2,388.8	928.5	278.7	180.2	217.4	246.0	137.0	135.9	176.6	68.9	19.6
Oak-gum-cypress	52.2	22.4	5.6	4.9	3.4	-	2.0	3.4	7.7	2.8	-
Elm-ash-cottonwood	553.7	244.8	44.5	39.7	67.9	66.8	72.6	-	17.4	-	-
Maple-beech-birch	788.0	296.8	46.1	63.2	88.7	68.8	89.7	33.1	60.0	29.7	11.9
Aspen-birch	13.1	13.1	-	-	-	-	-	-	-	-	-
All types	3,895.8	1,587.5	381.3	288.5	378.7	385.8	307.0	172.4	261.7	101.4	31.5

Table 15. — *Area of commercial forest land, by forest types and area-condition classes, Indiana, 1967*
(Thousand acres)

Forest type	All area conditions	Class 50	Class 60	Class 70
Loblolly-shortleaf pine	54.0	11.6	23.3	19.1
Oak-pine	46.0	9.1	33.0	3.9
Oak-hickory	2,388.8	459.6	1,282.8	646.4
Oak-gum-cypress	52.2	5.8	25.1	21.3
Elm-ash-cottonwood	553.7	26.6	230.6	296.5
Maple-beech-birch	788.0	105.8	418.0	264.2
Aspen-birch	13.1	3.0	3.0	7.1
All types	3,895.8	621.5	2,015.8	1,258.5

Table 16. — *Area of land and forest land, by counties, Indiana, 1967*

County	All land	Forest land: All forest	Forest land: Non-commercial	Forest land: Commercial	Commercial forest as a percent of land area
	Thousand acres	Thousand acres	Thousand acres	Thousand acres	Percent
Adams	220.8	14.3	0.3	14.0	6.3
Allen	429.3	35.6	.3	35.3	8.2
Bartholomew	257.3	35.5	.3	35.2	13.7
Benton	261.8	3.2	.2	3.0	1.1
Blackford	106.9	7.0	.1	6.9	6.4
Boone	273.3	11.5	.4	11.1	4.1
Brown	207.3	148.8	15.5	133.3	64.3
Carroll	239.4	16.2	.2	16.0	6.7
Cass	265.5	20.4	.2	20.2	7.6
Clark	245.8	92.3	.2	92.1	37.5
Clay	233.0	53.3	.3	53.0	22.7
Clinton	260.5	9.9	.4	9.5	3.6
Crawford	199.7	113.4	.6	112.8	56.5
Daviess	275.0	41.9	-	41.9	15.2
Dearborn	195.8	41.7	2.7	39.0	19.9
Decatur	236.7	23.4	.4	23.0	9.7
De Kalb	234.0	22.0	.3	21.7	9.3
Delaware	254.6	11.6	.4	11.2	4.4
Dubois	277.0	96.8	.1	96.7	34.9
Elkhart	299.5	25.7	.3	25.4	8.5
Fayette	137.6	16.3	.5	15.8	11.5
Floyd	95.4	36.8	.2	36.6	38.4
Fountain	254.1	27.1	.6	26.5	10.4
Franklin	252.2	58.2	1.6	56.6	22.4
Fulton	235.4	16.0	.2	15.8	6.7
Gibson	318.9	48.9	-	48.9	15.3
Grant	269.4	14.3	.3	14.0	5.2
Greene	351.4	99.8	.3	99.5	28.3
Hamilton	256.6	13.8	.2	13.6	5.3
Hancock	195.2	9.1	.2	8.9	4.6
Harrison	306.6	131.6	.7	130.9	42.7
Hendricks	266.9	15.6	.3	15.3	5.7
Henry	256.0	14.4	.2	14.2	5.5
Howard	187.5	6.8	.2	6.6	3.5
Huntington	249.6	20.5	.2	20.3	8.1
Jackson	332.8	122.2	.3	121.9	36.6
Jasper	359.7	25.1	.7	24.4	6.8
Jay	247.0	18.9	.3	18.6	7.5
Jefferson	234.2	62.3	1.6	60.7	25.9
Jennings	241.3	68.5	1.0	67.5	28.0
Johnson	201.6	12.5	.3	12.2	6.0
Knox	330.5	39.4	-	39.4	11.9
Kosciusko	345.7	27.8	.3	27.5	8.0
Lagrange	243.8	19.3	.3	19.0	7.8
Lake	328.0	9.7	.2	9.5	2.9
La Porte	388.6	28.3	.3	28.0	7.2
Lawrence	293.8	127.6	2.1	125.5	42.7
Madison	239.9	12.3	.6	11.7	4.0
Marion	256.1	13.7	.3	13.4	5.2
Marshall	283.8	25.4	.3	25.1	8.8
Martin	220.8	111.1	-	111.1	50.3
Miami	243.2	20.4	.2	20.2	8.3
Monroe	262.5	134.5	.7	133.8	51.0
Montgomery	324.5	23.8	2.0	21.8	6.7
Morgan	259.8	92.0	.1	91.9	35.4
Newton	264.3	18.6	.2	18.4	7.0
Noble	263.9	24.3	1.1	23.2	8.8
Ohio	55.7	13.5	.3	13.2	23.7
Orange	259.2	119.2	.8	118.4	45.7
Owen	249.2	115.7	1.9	113.8	45.7
Parke	288.6	92.4	2.4	90.0	31.2
Perry	245.8	143.6	.8	142.8	58.1
Pike	214.4	79.8	-	79.8	37.2
Porter	271.7	27.9	2.3	25.6	9.4
Posey	263.6	42.1	-	42.1	16.0
Pulaski	277.1	27.0	2.8	24.2	8.7
Putnam	313.6	72.2	.7	71.5	22.8
Randolph	292.5	14.7	.6	14.1	4.8
Ripley	282.9	54.6	4.8	49.8	17.6
Rush	261.8	12.5	.2	12.3	4.7
St. Joseph	298.4	21.8	.2	21.6	7.2
Scott	123.5	45.2	.1	45.1	36.5
Shelby	261.8	13.5	.5	13.0	5.0
Spencer	253.4	69.6	1.8	67.8	26.8
Starke	198.7	24.7	.3	24.4	12.3
Steuben	198.0	23.6	1.0	22.6	11.4
Sullivan	292.5	54.1	.3	53.8	18.4
Switzerland	141.4	39.3	.5	38.8	27.4
Tippecanoe	319.7	19.2	.4	18.8	5.9
Tipton	167.0	6.4	.1	6.3	3.8
Union	107.5	13.2	.9	12.3	11.4
Vanderburgh	154.3	20.0	-	20.0	13.0
Vermillion	168.3	35.0	-	35.0	20.8
Vigo	265.5	50.2	-	50.2	18.9
Wabash	269.3	21.3	.2	21.1	7.8
Warren	235.5	20.3	.2	20.1	8.5
Warrick	250.2	76.2	.7	75.5	30.2
Washington	330.2	130.6	.3	130.3	39.5
Wayne	259.1	23.3	.2	23.1	8.9
Wells	235.5	17.3	.9	16.4	7.0
White	317.9	12.7	.3	12.4	3.9
Whitley	215.5	20.2	.2	20.0	9.3
All counties	23,161.1	3,964.3	68.5	3,895.8	16.8

Table 17. — *Area of commercial forest land, by counties and stand-size classes, Indiana, 1967*
(Thousand acres)

County	All stands	Saw-timber stands	Pole-timber stands	Sapling and seedling stands	Non-stocked areas
Adams	14.0	9.1	2.3	2.3	0.3
Allen	35.3	20.3	7.6	6.3	1.1
Bartholomew	35.2	22.9	5.9	5.9	.5
Benton	3.0	.4	1.1	1.3	.2
Blackford	6.9	4.8	.9	.8	.4
Boone	11.1	4.1	2.1	3.8	1.1
Brown	133.3	80.1	28.8	24.2	.2
Carroll	16.0	8.5	3.6	3.2	.7
Cass	20.2	13.1	3.9	3.0	.2
Clark	92.1	44.8	29.6	17.1	.6
Clay	53.0	26.2	10.0	16.1	.7
Clinton	9.5	5.8	1.2	2.2	.3
Crawford	112.8	48.0	35.6	29.0	.2
Daviess	41.9	22.8	9.4	8.8	.9
Dearborn	39.0	15.5	6.3	12.2	5.0
Decatur	23.0	14.5	4.2	3.7	.6
De kalb	21.7	12.7	4.5	3.9	.6
Delaware	11.2	7.3	2.2	1.4	.3
Dubois	96.7	56.0	18.5	21.6	.6
Elkhart	25.4	14.2	3.9	6.3	1.0
Fayette	15.8	8.0	3.0	3.6	1.2
Floyd	36.6	21.1	9.1	6.2	.2
Fountain	26.5	17.9	5.4	2.8	.4
Franklin	56.6	29.6	10.8	12.9	3.3
Fulton	15.8	10.3	2.5	2.8	.2
Gibson	48.9	30.3	8.1	9.3	1.2
Grant	14.0	9.3	1.8	2.7	.2
Greene	99.5	46.8	22.3	29.5	.9
Hamilton	13.6	8.6	2.1	2.6	.3
Hancock	8.9	5.6	.8	2.0	.5
Harrison	130.9	64.3	29.7	36.3	.6
Hendricks	15.3	7.6	3.9	3.1	.7
Henry	14.2	8.2	3.2	2.2	.6
Howard	6.6	3.6	1.4	1.4	.2
Huntington	20.3	9.9	5.2	4.4	.8
Jackson	121.9	62.7	27.5	31.1	.6
Jasper	24.4	11.5	6.7	5.3	.9
Jay	18.6	12.9	2.0	2.7	1.0
Jefferson	60.7	30.3	13.6	14.8	2.0
Jennings	67.5	39.6	13.9	11.8	2.2
Johnson	12.2	8.3	2.2	1.4	.3
Knox	39.4	19.4	8.9	9.9	1.2
Kosciusko	27.5	15.7	4.6	5.4	1.8
Lagrange	19.0	9.4	3.6	5.0	1.0
Lake	9.5	5.4	2.0	1.9	.2
La Porte	28.0	13.8	5.9	7.7	.6
Lawrence	125.5	62.2	23.2	39.5	.6
Madison	11.7	6.3	1.4	3.3	.7
Marion	13.4	7.9	2.8	2.5	.2
Marshall	25.1	15.8	3.5	5.2	0.6
Martin	111.1	65.3	23.0	22.5	.3
Miami	20.2	10.7	4.3	4.8	.4
Monroe	133.8	68.7	36.0	28.7	.4
Montgomery	21.8	10.4	7.0	4.1	.3
Morgan	91.9	42.8	26.5	22.0	.6
Newton	18.4	7.6	3.7	6.7	.4
Noble	23.2	12.5	5.4	4.6	.7
Ohio	13.2	5.6	2.5	4.3	.8
Orange	118.4	52.2	29.4	36.4	.4
Owen	113.8	56.9	30.1	26.4	.4
Parke	90.0	45.1	21.6	22.5	.8
Perry	142.8	74.0	40.1	28.3	.4
Pike	79.8	27.2	16.6	35.4	.6
Porter	25.6	13.7	6.7	4.2	1.0
Posey	42.1	25.8	7.1	8.3	.9
Pulaski	24.2	11.0	6.6	6.1	.5
Putnam	71.5	39.5	15.6	15.5	.9
Randolph	14.1	8.1	2.9	2.8	.3
Ripley	49.8	24.9	10.9	11.0	3.0
Rush	12.3	7.7	1.6	2.0	1.0
St. Joseph	21.6	11.7	5.4	3.8	.7
Scott	45.1	25.4	9.7	9.8	.2
Shelby	13.0	8.1	.7	3.6	.6
Spencer	67.8	36.3	11.5	19.4	.6
Starke	24.4	12.7	6.4	4.8	.5
Steuben	22.6	11.7	3.8	6.5	.6
Sullivan	53.8	27.5	13.6	11.8	.9
Switzerland	38.8	12.6	12.1	12.3	1.8
Tippecanoe	18.8	9.9	4.3	4.2	.4
Tipton	6.3	4.2	.5	1.6	-
Union	12.3	6.3	2.7	2.5	.8
Vanderburgh	20.0	11.9	4.1	3.4	.6
Vermillion	35.0	19.2	6.6	8.6	.6
Vigo	50.2	25.2	10.7	13.4	.9
Wabash	21.1	12.6	4.0	3.8	.7
Warren	20.1	11.6	4.5	3.6	.4
Warrick	75.5	25.8	14.4	34.7	.6
Washington	130.3	79.5	25.4	24.8	.6
Wayne	23.1	13.2	4.8	4.5	.6
Wells	16.4	10.7	2.7	2.7	.3
White	12.4	6.5	3.3	2.2	.4
Whitley	20.0	10.8	4.2	4.3	.7
All counties	3,895.8	2,036.5	865.7	925.3	68.3

Table 18. — *Area of commercial forest land, by forest types and counties, Indiana, 1967*
(Thousand acres)

County	All types	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch
Adams	14.0	-	-	5.9	0.1	4.9	2.9	0.2
Allen	35.3	0.1	-	13.3	.5	12.3	9.0	.1
Bartholomew	35.2	-	-	16.0	.6	7.4	11.1	.1
Benton	3.0	-	-	.9	.4	1.3	0.4	-
Blackford	6.9	-	-	2.4	-	2.4	2.1	-
Boone	11.1	.2	-	5.3	-	2.8	2.8	-
Brown	133.3	1.6	3.4	102.0	.6	4.2	21.5	-
Carroll	16.0	-	-	7.1	.3	3.9	4.6	.1
Cass	20.2	-	-	8.4	1.1	3.5	7.2	-
Clark	92.1	5.0	2.6	63.7	.5	4.1	16.2	-
Clay	53.0	.4	-	34.8	.9	10.2	6.3	.4
Clinton	9.5	-	-	2.9	.1	3.5	3.0	-
Crawford	112.8	2.4	3.0	87.5	.4	3.9	15.6	-
Daviess	41.9	.4	-	26.3	1.1	9.2	4.4	.5
Dearborn	39.0	-	-	15.7	2.7	7.7	12.9	-
Decatur	23.0	.1	-	9.9	.4	5.3	7.1	.2
De Kalb	21.7	.1	-	7.0	1.0	8.1	5.5	-
Delaware	11.2	-	-	4.4	-	2.8	3.7	.3
Dubois	96.7	2.2	1.9	63.1	1.1	9.8	18.6	-
Elkhart	25.4	-	-	9.5	.5	7.4	8.0	-
Fayette	15.8	-	-	8.0	1.2	2.7	3.9	-
Floyd	36.6	1.0	1.1	27.1	.1	.9	6.4	-
Fountain	26.5	.1	-	11.5	.4	6.3	8.1	.1
Franklin	56.6	-	-	29.0	2.8	9.6	15.2	-
Fulton	15.8	-	-	7.8	.1	3.1	4.8	-
Gibson	48.9	.4	-	26.3	2.0	14.0	6.2	-
Grant	14.0	-	-	5.6	-	3.1	5.3	-
Greene	99.5	2.6	-	72.4	1.5	11.8	11.2	-
Hamilton	13.6	-	-	5.5	-	3.7	4.4	-
Hancock	8.9	-	-	1.6	.3	2.0	5.0	-
Harrison	130.9	5.6	4.5	94.4	.4	6.4	19.6	-
Hendricks	15.3	-	-	6.9	-	5.1	3.0	.3
Henry	14.2	-	-	5.0	-	2.5	6.5	.2
Howard	6.6	.1	-	2.8	-	2.6	1.1	-
Huntington	20.3	.2	-	9.3	.2	6.0	4.5	.1
Jackson	121.9	2.1	2.6	82.5	.9	9.2	24.6	-
Jasper	24.4	.1	-	11.9	1.1	5.6	5.4	.3
Jay	18.6	-	-	7.1	.1	4.4	6.9	.1
Jefferson	60.7	-	-	35.0	1.3	7.2	17.2	-
Jennings	67.5	-	-	36.7	1.6	9.5	19.7	-
Johnson	12.2	-	-	5.8	.1	3.6	2.7	-
Knox	39.4	.4	-	22.4	.5	10.7	5.4	-
Kosciusko	27.5	-	-	11.2	.4	6.9	8.9	.1
Lagrange	19.0	.1	-	8.2	.2	5.7	4.8	-
Lake	9.5	-	-	4.0	.6	3.3	1.6	-
La Porte	28.0	.5	-	15.6	1.1	5.1	5.4	.3
Lawrence	125.5	1.5	3.2	88.4	.4	10.0	22.0	-
Madison	11.7	-	-	3.4	.1	2.8	5.4	-
Marion	13.4	-	-	5.1	.5	2.3	5.5	-

(Continued on next page)

Table 18 (Continued)

County	All types	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch
Marshall	25.1	0.2	-	12.0	0.8	5.5	6.6	-
Martin	111.1	1.7	-	80.6	2.6	11.0	14.8	0.4
Miami	20.2	.4	-	8.7	.2	4.3	6.6	-
Monroe	133.8	1.9	4.5	99.8	.1	4.1	23.4	-
Montgomery	21.8	.2	-	11.8	.2	5.7	3.7	.2
Morgan	91.9	.8	2.4	66.0	1.2	5.4	16.1	-
Newton	18.4	-	-	9.5	.3	4.2	4.3	.1
Noble	23.2	-	-	11.3	.4	4.0	7.1	.4
Ohio	13.2	-	-	5.9	.7	2.7	3.9	-
Orange	118.4	3.4	3.8	79.6	.3	9.9	21.4	-
Owen	113.8	1.0	2.0	85.7	.4	4.5	20.2	-
Parke	90.0	2.2	-	62.7	.7	12.7	11.7	-
Perry	142.8	5.8	3.6	105.7	.7	4.7	22.3	-
Pike	79.8	2.0	-	43.9	.8	19.6	8.6	4.9
Porter	25.6	-	-	11.0	.4	6.8	6.9	.5
Posey	42.1	-	-	25.4	.9	10.6	5.2	-
Pulaski	24.2	-	-	12.3	.3	5.3	6.0	.3
Putnam	71.5	1.2	-	52.9	1.5	8.9	7.0	-
Randolph	14.1	-	-	5.7	.5	3.3	4.5	.1
Ripley	49.8	-	-	25.4	1.6	9.4	13.4	-
Rush	12.3	-	-	3.2	-	4.5	4.5	.1
St. Joseph	21.6	-	-	9.4	.3	5.7	6.2	-
Scott	45.1	.4	.7	32.3	.6	3.2	7.9	-
Shelby	13.0	-	-	3.7	-	4.0	5.3	-
Spencer	67.8	.4	1.3	40.9	.2	9.8	15.2	-
Starke	24.4	-	-	12.3	.9	4.9	5.9	.4
Steuben	22.6	.2	-	9.1	-	5.5	7.5	.3
Sullivan	53.8	-	-	30.4	.5	13.0	8.7	1.2
Switzerland	38.8	-	-	22.1	.3	3.7	12.7	-
Tippecanoe	18.8	.1	-	7.8	.5	4.6	5.7	.1
Tipton	6.3	-	-	2.0	-	2.6	1.7	-
Union	12.3	-	-	5.8	.5	3.1	2.9	-
Vanderburgh	20.0	-	-	12.5	.1	4.6	2.8	-
Vermillion	35.0	-	-	23.1	1.2	5.8	4.9	-
Vigo	50.2	.8	-	28.0	.4	11.8	8.8	.4
Wabash	21.1	.1	-	8.4	.1	6.5	5.9	.1
Warren	20.1	-	-	10.4	-	5.2	4.5	-
Warrick	75.5	1.7	2.3	49.4	.5	8.3	13.3	-
Washington	130.3	1.8	3.1	93.9	.7	5.4	25.4	-
Wayne	23.1	-	-	9.3	.4	6.7	6.5	.2
Wells	16.4	-	-	7.4	-	4.2	4.8	-
White	12.4	-	-	7.0	.1	2.5	2.8	-
Whitley	20.0	.5	-	7.9	.1	4.7	6.8	-
All counties	3,895.8	54.0	46.0	2,388.8	52.2	553.7	788.0	13.1

Table 19. — *Area of noncommercial forest land, by forest types, Indiana, 1967*
(Thousand acres)

Forest type	All areas	Productive: reserved areas	Unproductive areas
Loblolly-shortleaf pine	0.5	0.5	-
Oak-pine	-	-	-
Oak-hickory	55.0	28.7	26.3
Oak-gum-cypress	-	-	-
Elm-ash-cottonwood	6.0	2.3	3.7
Maple-beech-birch	7.0	7.0	-
Aspen-birch	-	-	-
All types	68.5	38.5	30.0

Table 20. — *Number of growing-stock trees on commercial forest land, by species and diameter classes, Indiana, 1967*
(Thousand trees)

Species	All classes	Diameter class (inches at breast height) 5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
Softwoods:											
Shortleaf and loblolly pine	2,956	1,674	1,021	240	21	-	-	-	-	-	-
Other yellow pines	3,842	1,897	1,218	478	159	69	10	11	-	-	-
Cypress	61	-	-	-	-	-	-	7	-	31	23
Other softwoods	4,569	2,400	1,517	423	158	59	-	12	-	-	-
Total softwoods	11,428	5,971	3,756	1,141	338	128	10	30	-	31	23
Hardwoods:											
White oak	37,746	10,886	8,942	6,151	4,085	3,124	2,053	1,037	661	736	71
Other select white oaks	2,631	650	583	342	224	217	138	109	151	181	36
Select red oak	15,138	3,664	2,657	2,489	1,805	1,684	1,092	581	486	607	73
Other white oaks	9,278	1,905	1,798	1,795	1,457	1,243	623	300	81	71	5
Black oak	20,684	5,411	3,712	3,276	2,703	2,061	1,372	1,008	523	574	44
Other red oaks	6,408	1,448	1,529	985	902	426	386	243	197	272	20
Hickory	47,740	19,158	10,961	7,959	4,282	2,687	1,557	572	296	250	18
Hard maple	29,918	12,724	7,044	3,968	2,413	1,526	1,226	510	248	251	8
Soft maple	11,495	4,706	2,926	1,460	851	674	368	209	109	166	26
Beech	7,008	1,466	1,559	1,005	724	699	525	418	245	329	38
Sweetgum	4,985	1,720	1,646	646	357	301	175	71	33	28	8
Tupelo and blackgum	2,858	857	674	574	320	198	77	70	54	34	-
Ash	23,703	11,005	5,555	2,914	1,877	1,102	722	323	89	114	2
Cottonwood	3,236	828	614	392	448	300	167	117	115	229	26
Aspen	2,906	1,263	653	562	231	135	47	7	8	-	-
Basswood	2,543	913	487	371	199	227	125	110	59	50	2
Yellow-poplar	13,015	3,819	2,658	1,974	1,653	1,397	570	392	261	283	8
Black walnut	8,374	2,793	2,435	1,153	843	645	303	117	72	13	-
Black cherry	6,125	2,562	1,695	905	338	277	250	48	15	35	-
Elm	13,289	5,980	3,564	1,908	978	284	263	153	63	96	-
Sycamore	7,864	2,070	1,685	1,472	780	565	457	255	234	280	66
Other hardwoods	22,995	11,477	5,567	3,025	1,507	703	355	150	118	83	10
Total hardwoods	299,939	107,305	68,944	45,326	28,977	20,475	12,851	6,800	4,118	4,682	461
All species	311,367	113,276	72,700	46,467	29,315	20,603	12,861	6,830	4,118	4,713	484

Table 21. — *Number of growing-stock trees on commercial forest land, by species groups, diameter classes, and Forest Survey Units, Indiana, 1967*
(Thousand trees)

Species group	All classes	Diameter class (inches at breast height)												
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0 and larger
All Units														
Softwoods	54,017	27,168	15,421	5,971	3,756	1,141	338	128	10	30	-	8	23	23
Hardwoods	1,002,872	498,770	204,163	107,305	68,944	45,326	28,977	20,475	12,851	6,800	4,118	2,246	2,436	461
All species	1,056,889	525,938	219,584	113,276	72,700	46,467	29,315	20,603	12,861	6,830	4,118	2,254	2,459	484
Lower Wabash Unit														
Softwoods	2,913	1,041	1,145	465	174	27	-	-	-	7	-	8	23	23
Hardwoods	223,643	111,087	42,900	26,683	17,018	9,492	6,121	4,039	2,742	1,540	970	415	541	95
All species	226,556	112,128	44,045	27,148	17,192	9,519	6,121	4,039	2,742	1,547	970	423	564	118
Knobs Unit														
Softwoods	44,098	22,857	11,879	4,564	3,309	1,056	284	128	10	11	-	-	-	-
Hardwoods	510,098	253,667	105,764	51,924	33,533	25,277	15,977	10,983	6,176	3,226	1,624	906	887	154
All species	554,196	276,524	117,643	56,488	36,842	26,333	16,261	11,111	6,186	3,237	1,624	906	887	154
Upland Flats Unit														
Softwoods	2,623	1,541	819	227	33	-	3	-	-	-	-	-	-	-
Hardwoods	53,123	21,686	12,676	7,421	3,928	2,680	1,282	1,455	847	451	301	186	179	31
All species	55,746	23,227	13,495	7,648	3,961	2,680	1,285	1,455	847	451	301	186	179	31
Northern Unit														
Softwoods	4,383	1,729	1,578	715	240	58	51	-	-	12	-	-	-	-
Hardwoods	216,008	112,330	42,823	21,277	14,465	7,877	5,597	3,998	3,086	1,583	1,223	739	829	181
All species	220,391	114,059	44,401	21,992	14,705	7,935	5,648	3,998	3,086	1,595	1,223	739	829	181

Table 22. — *Number of cull trees on commercial forest land, by species and diameter classes, Indiana, 1967*
(Thousand trees)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
Softwoods:											
Shortleaf and loblolly pine	182	114	42	18	8	-	-	-	-	-	-
Other yellow pines	319	214	54	38	-	7	-	5	1	-	-
Cypress	-	-	-	-	-	-	-	-	-	-	-
Other softwoods	941	622	99	86	100	28	-	-	6	-	-
Total softwoods	1,442	950	195	142	108	35	-	5	7	-	-
Hardwoods:											
White oak	3,795	1,511	449	407	448	255	149	159	115	205	97
Other select white oaks	355	195	-	-	60	12	23	19	11	27	8
Select red oak	1,155	246	231	160	90	122	70	61	33	99	43
Other white oaks	516	141	32	53	73	117	53	7	35	5	-
Black oak	2,636	650	253	398	289	247	273	161	126	183	56
Other red oaks	1,267	638	108	177	121	97	46	32	26	18	4
Hickory	4,035	1,780	705	429	470	283	152	79	59	74	4
Hard maple	5,093	879	1,092	699	645	556	402	258	159	361	42
Soft maple	5,349	2,012	1,345	619	541	215	191	136	83	150	57
Beech	4,226	1,074	715	533	347	89	246	314	144	614	150
Sweetgum	943	558	197	63	66	-	23	10	16	10	-
Tupelo and blackgum	501	191	66	94	57	35	34	18	-	6	-
Ash	3,630	1,745	703	370	388	195	79	43	26	77	4
Cottonwood	556	114	231	74	61	28	-	17	8	15	8
Aspen	546	467	49	-	21	-	-	9	-	-	-
Basswood	471	-	56	47	85	53	93	19	43	63	12
Yellow-poplar	1,073	521	79	79	154	46	35	49	6	79	25
Black walnut	2,140	726	414	367	337	93	85	72	23	23	-
Black cherry	3,247	1,685	669	392	172	210	38	41	33	7	-
Elm	5,188	2,499	1,549	569	232	95	101	81	37	24	1
Sycamore	1,068	140	362	95	48	140	64	74	57	62	26
Other hardwoods	13,421	7,928	2,084	1,555	833	474	259	114	42	110	22
Noncommercial species	5,129	4,106	747	157	60	15	36	-	8	-	-
Total hardwoods	66,340	29,806	12,136	7,337	5,598	3,377	2,452	1,773	1,090	2,212	559
All species	67,782	30,756	12,331	7,479	5,706	3,412	2,452	1,778	1,097	2,212	559

Table 23. — *Number of short-log trees on commercial forest land, by species and diameter classes, Indiana, 1967*
(Thousand trees)

Species	All diameters	Diameter class (inches at breast height) 9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0 and larger
Softwoods:										
Shortleaf and loblolly pine	13	5	8	-	-	-	-	-	-	-
Other yellow pines	1	-	-	-	-	-	1	-	-	-
Cypress	-	-	-	-	-	-	-	-	-	-
Other softwoods	11	11	-	-	-	-	-	-	-	-
Total softwoods	25	16	8	-	-	-	1	-	-	-
Hardwoods:										
White oak	574	-	144	139	67	77	41	33	51	22
Other select white oaks	52	-	23	-	-	16	6	-	3	4
Select red oak	185	-	44	46	33	24	-	5	33	-
Other white oaks	80	-	13	53	2	7	5	-	-	-
Black oak	477	-	169	89	68	56	51	22	11	11
Other red oaks	135	-	62	22	22	20	6	-	3	-
Hickory	391	-	164	120	41	30	31	5	-	-
Hard maple	381	-	138	102	46	59	5	14	17	-
Soft maple	282	-	158	71	23	6	9	6	7	2
Beech	204	-	101	10	34	35	10	6	8	-
Sweetgum	28	-	20	-	-	-	4	4	-	-
Tupelo and blackgum	4	-	-	4	-	-	-	-	-	-
Ash	237	-	127	52	28	16	2	5	7	-
Cottonwood	4	-	-	-	-	-	-	-	4	-
Aspen	-	-	-	-	-	-	-	-	-	-
Basswood	36	-	-	-	31	-	-	-	5	-
Yellow-poplar	34	-	24	-	2	-	-	-	8	-
Black walnut	216	-	144	26	25	18	3	-	-	-
Black cherry	95	-	52	43	-	-	-	-	-	-
Elm	106	-	71	7	9	18	-	-	-	1
Sycamore	67	-	4	29	19	6	-	9	-	-
Other hardwoods	181	-	70	59	39	-	-	8	5	-
Total hardwoods	3,769	-	1,528	872	489	388	173	117	162	40
All species	3,794	16	1,536	872	489	388	174	117	162	40

Table 24. — *Net volume of timber on commercial forest land, by class of timber and by softwoods and hardwoods, Indiana, 1967*
(Million cubic feet)

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Saw-log portion	2,020.3	25.9	1,994.4
Upper-stem portion	356.5	4.6	351.9
Total sawtimber	2,376.8	30.5	2,346.3
Poletimber trees	1,126.2	30.3	1,095.9
Total growing stock	3,503.0	60.8	3,442.2
Rough trees	310.1	3.2	306.9
Rotten trees	70.0	.1	69.9
Salvable dead trees	22.1	.4	21.7
All classes	3,905.2	64.5	3,840.7

Table 25. — *Net volume of growing stock and sawtimber on commercial forest land, by ownership classes and by softwoods and hardwoods, Indiana, 1967*

Ownership class	Growing stock			Sawtimber		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
	Million cubic feet			Million board feet 1/		
National Forest	155.8	9.4	146.4	353.5	9.2	344.3
Other public	248.7	14.1	234.6	836.0	48.7	787.3
Forest industry	20.6	.4	20.2	64.5	.8	63.7
Farmer and miscellaneous private	3,077.9	36.9	3,041.0	9,631.4	109.2	9,522.2
All ownerships	3,503.0	60.8	3,442.2	10,885.4	167.9	10,717.5

1/ International 1/4-inch rule.

Table 26. — *Net volume of growing stock on commercial forest land, by species and diameter classes, Indiana, 1967*
(Million cubic feet)

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0 and larger
Softwoods:											
Shortleaf and loblolly pine	10.8	3.6	5.3	1.7	0.2	-	-	-	-	-	-
Other yellow pines	21.0	4.3	6.8	4.8	2.9	1.4	0.3	0.5	-	-	-
Cypress	11.6	-	-	-	-	-	-	.5	-	4.5	6.6
Other softwoods	17.4	4.7	5.6	3.4	2.0	1.1	-	.6	-	-	-
Total softwoods	60.8	12.6	17.7	9.9	5.1	2.5	.3	1.6	-	4.5	6.6
Hardwoods:											
White oak	495.9	26.1	49.8	63.7	67.5	74.0	68.0	43.9	35.1	57.6	10.2
Other select white oaks	50.6	1.5	3.0	3.6	3.0	4.5	4.0	4.4	6.7	14.2	5.7
Select red oaks	271.2	10.1	15.7	27.6	31.0	41.0	36.0	25.0	26.2	48.0	10.6
Other white oaks	119.9	4.7	10.0	18.0	22.4	26.2	17.6	11.6	3.7	4.8	.9
Black oak	318.5	12.1	20.9	32.5	43.2	48.2	41.6	41.0	28.3	44.2	6.5
Other red oaks	101.9	3.2	7.8	9.3	13.1	9.7	11.9	10.0	11.1	22.3	3.5
Hickory	441.8	43.0	62.2	82.0	72.8	64.4	50.8	24.4	17.0	22.0	3.2
Hard maple	287.6	30.3	41.2	41.8	42.1	37.9	40.3	21.9	13.5	17.3	1.3
Soft maple	126.3	12.4	17.2	16.1	15.0	17.4	13.0	9.1	6.4	14.8	4.9
Beech	132.0	3.4	9.0	9.6	12.1	17.4	17.4	17.7	14.3	26.4	4.7
Sweetgum	49.9	3.5	8.5	6.9	6.5	8.6	6.8	3.4	1.8	3.0	.9
Tupelo and blackgum	30.2	1.8	3.1	5.0	4.4	4.1	2.6	3.0	3.2	3.0	-
Ash	191.3	25.1	30.1	29.3	30.2	26.9	22.6	13.8	4.6	8.4	.3
Cottonwood	69.4	1.4	3.8	4.4	8.4	8.0	6.9	5.7	6.4	20.2	4.2
Aspen	25.0	3.4	4.1	6.9	4.7	3.6	1.6	.2	.5	-	-
Basswood	31.5	1.8	2.8	3.4	2.8	5.3	3.6	4.4	2.9	4.2	.3
Yellow-poplar	183.5	8.9	15.2	21.4	28.5	32.8	19.1	18.9	15.2	22.4	1.1
Black walnut	64.5	5.8	10.2	9.4	11.1	11.8	8.3	4.2	3.1	0.6	-
Black cherry	48.5	5.7	9.4	9.1	5.6	6.4	7.1	1.9	.7	2.6	-
Elm	95.9	12.4	18.7	17.7	15.8	6.9	7.9	6.1	3.2	7.2	-
Sycamore	149.8	4.9	12.1	17.4	13.8	15.7	16.7	13.8	15.7	26.7	13.0
Other hardwoods	157.0	26.6	28.2	29.7	24.3	17.0	10.6	6.4	6.6	6.1	1.5
Total hardwoods	3,442.2	248.1	383.0	464.8	478.3	487.8	414.4	290.8	226.2	376.0	72.8
All species	3,503.0	260.7	400.7	474.7	483.4	490.3	414.7	292.4	226.2	380.5	79.4

Table 27. — *Net volume of sawtimber on commercial forest land, by species and diameter classes, Indiana, 1967*
(Million board feet)[1]

Species	All classes	Diameter class (inches at breast height) 9.0- 2/ :10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0 and larger
Softwoods:									
Shortleaf and loblolly pine	10.1	8.9	1.2	-	-	-	-	-	-
Other yellow pines	48.8	21.9	14.4	8.4	1.7	2.4	-	-	-
Cypress	78.7	-	-	-	-	2.4	-	31.4	44.9
Other softwoods	30.3	13.0	8.3	6.1	-	2.9	-	-	-
Total softwoods	167.9	43.8	23.9	14.5	1.7	7.7	-	31.4	44.9
Hardwoods:									
White oak	1,590.6	-	290.6	345.4	307.6	201.9	154.1	252.4	38.6
Other select white oaks	189.1	-	12.2	19.6	18.1	21.0	31.8	66.3	20.1
Select red oak	1,050.0	-	138.4	202.4	180.7	125.1	124.1	233.0	46.3
Other white oaks	427.9	-	107.8	128.4	88.2	58.1	18.8	21.7	4.9
Black oak	1,225.6	-	191.7	247.2	204.8	206.7	137.4	208.1	29.7
Other red oaks	354.0	-	55.2	42.4	50.1	46.7	50.3	97.1	12.2
Hickory	1,201.6	-	337.7	304.2	246.2	119.5	82.8	94.9	16.3
Hard maple	751.5	-	172.4	168.9	172.1	99.4	54.0	80.0	4.7
Soft maple	330.5	-	53.0	74.7	55.6	36.2	26.8	60.0	24.2
Beech	490.9	-	51.4	78.2	81.5	80.6	60.6	119.6	19.0
Sweetgum	131.8	-	26.0	34.5	29.3	14.4	8.0	15.3	4.3
Tupelo and blackgum	97.7	-	19.4	17.5	12.1	15.4	17.8	15.5	-
Ash	485.9	-	125.4	121.0	106.0	67.8	22.0	42.4	1.3
Cottonwood	279.2	-	31.8	38.2	31.7	28.5	31.2	97.9	19.9
Aspen	48.9	-	20.9	16.3	7.2	1.5	3.0	-	-
Basswood	111.4	-	13.4	24.0	18.2	21.7	13.2	19.0	1.9
Yellow-poplar	650.8	-	125.1	156.3	94.2	91.9	72.7	105.6	5.0
Black walnut	177.8	-	48.3	51.7	38.8	22.9	13.7	2.4	-
Black cherry	105.4	-	22.8	28.5	32.1	8.5	3.4	10.1	-
Elm	202.2	-	66.4	28.4	34.4	27.6	16.0	29.4	-
Sycamore	504.9	-	53.0	62.6	70.2	66.2	75.3	114.7	62.9
Other hardwoods	309.8	-	100.2	68.8	46.6	30.1	27.5	29.6	7.0
Total hardwoods	10,717.5	-	2,063.1	2,259.2	1,925.7	1,391.7	1,044.5	1,715.0	318.3
All species	10,885.4	43.8	2,087.0	2,273.7	1,927.4	1,399.4	1,044.5	1,746.4	363.2

1/ International 1/4-inch rule.
2/ Softwoods only.

Table 28. — *Net volume of sawtimber on commercial forest land, by species and quality classes, Indiana, 1967*
(Million board feet) [1]

Species	All classes	Log Grade 1	Log Grade 2	Log Grade 3	Log Grade 4
Softwoods:					
Shortleaf and loblolly pine	10.1	-	-	5.9	4.2
Other yellow pines	48.8	-	1.5	36.7	10.6
Cypress	78.7	27.3	22.6	28.8	-
Other softwoods	30.3	-	-	25.6	4.7
Total softwoods	167.9	27.3	24.1	97.0	19.5
Hardwoods:					
White oak	1,590.6	436.0	406.5	579.3	168.8
Other select white oaks	189.1	65.9	36.5	64.0	22.7
Select red oak	1,050.0	356.9	253.3	377.1	62.7
Other white oaks	427.9	79.9	156.0	167.9	24.1
Black oak	1,225.6	322.3	343.8	396.5	163.0
Other red oaks	354.0	33.9	54.3	136.9	128.9
Hickory	1,201.6	195.1	309.7	540.3	156.5
Hard maple	751.5	83.0	267.0	271.0	130.5
Soft maple	330.5	81.7	76.0	134.3	38.5
Beech	490.9	56.2	97.5	206.9	130.3
Sweetgum	131.8	30.4	39.3	52.8	9.3
Tupelo and blackgum	97.7	21.9	28.5	41.2	6.1
Ash	485.9	113.3	160.8	171.5	40.3
Cottonwood	279.2	112.1	57.1	97.6	12.4
Aspen	48.9	2.8	12.8	29.4	3.9
Basswood	111.4	42.8	32.0	34.7	1.9
Yellow-poplar	650.8	140.7	193.2	242.7	74.2
Black walnut	177.8	42.3	64.0	68.5	3.0
Black cherry	105.4	16.1	38.6	43.4	7.3
Elm	202.2	37.2	55.4	95.5	14.1
Sycamore	504.9	225.8	80.9	177.2	21.0
Other hardwoods	309.8	46.2	82.0	155.0	26.6
Total hardwoods	10,717.5	2,542.5	2,845.2	4,083.7	1,246.1
All species	10,885.4	2,569.8	2,869.3	4,180.7	1,265.6

1/ International 1/4-inch rule.

Table 29. — *Percentage of sawtimber trees on commercial forest land by butt-log grades and species, Indiana, 1967*
(In percent)

Species	Percent of trees by butt-log grade			
	Grade 1	Grade 2	Grade 3	Grade 4
Softwoods:				
Shortleaf and loblolly pine	-	-	35	65
Other yellow pines	-	3	93	4
Cypress	46	36	18	-
Other softwoods	-	-	91	9
Total softwoods	2	3	77	18
Hardwoods:				
White ash	21	38	39	2
Other select white oaks	35	25	40	-
Select red oaks	25	33	38	4
Other white oaks	12	47	41	-
Black oak	19	34	43	4
Other red oaks	8	12	43	37
Hickory	12	35	48	5
Hard maple	14	31	51	4
Soft maple	11	32	53	4
Beech	9	24	55	12
Sweetgum	23	36	39	2
Tupelo and blackgum	23	38	39	-
Ash	18	40	41	1
Cottonwood	38	28	31	3
Aspen	4	20	76	-
Basswood	39	33	28	-
Yellow-poplar	19	38	38	5
Black walnut	12	38	50	-
Black cherry	14	49	37	-
Elm	14	30	54	2
Sycamore	30	28	41	1
Other hardwoods	12	31	56	1
Total hardwoods	18	34	44	4
All species	17	32	46	5

Table 30. — *Net volume of growing stock on commercial forest land, by species and Forest Survey Units, Indiana, 1967*
(Million cubic feet)

Species	All units	Lower Wabash Unit	Upland Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	10.8	0.3	10.4	-	0.1
Other yellow pines	21.0	.2	20.2	-	.6
Cypress	11.6	11.6	-	-	-
Other softwoods	17.4	1.4	11.5	0.4	4.1
Total softwoods	60.8	13.5	42.1	.4	4.8
Hardwoods:					
White oak	495.9	84.3	300.8	42.4	68.4
Other select white oaks	50.6	12.2	13.0	2.5	22.9
Select red oak	271.2	59.2	125.5	23.5	63.0
Other white oaks	119.9	2.9	107.9	1.0	8.1
Black oak	318.5	48.8	202.7	15.6	51.4
Other red oaks	101.9	28.9	37.6	4.9	30.5
Hickory	441.8	114.2	230.7	27.6	69.3
Hard maple	287.6	40.3	142.4	36.1	68.8
Soft maple	126.3	54.9	20.3	12.1	39.0
Beech	132.0	7.8	77.3	18.5	28.4
Sweetgum	49.9	16.9	20.4	7.3	5.3
Tupelo and blackgum	30.2	8.6	18.8	1.9	.9
Ash	191.3	45.1	64.1	13.7	68.4
Cottonwood	69.4	10.6	10.5	1.0	47.3
Aspen	25.0	3.1	7.6	2.5	11.8
Basswood	31.5	4.3	10.8	1.6	14.8
Yellow-poplar	183.5	55.3	92.5	12.6	23.1
Black walnut	64.5	17.5	21.2	2.5	23.3
Black cherry	48.5	5.8	19.9	3.9	18.9
Elm	95.9	27.1	37.9	3.7	27.2
Sycamore	149.8	41.9	71.2	2.8	33.9
Other hardwoods	157.0	63.0	49.6	4.6	39.8
Total hardwoods	3,442.2	752.7	1,682.7	242.3	764.5
All species	3,503.0	766.2	1,724.8	242.7	769.3

Table 31. — *Net volume of sawtimber on commercial forest land, by species and Forest Survey Units, Indiana, 1967*
(Million board feet)[1]

Species	All units	Lower Wabash Unit	Upland Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	10.1	-	10.1	-	-
Other yellow pines	48.8	-	48.8	-	-
Cypress	78.7	78.7	-	-	-
Other softwoods	30.3	1.3	22.0	0.1	6.9
Total softwoods	167.9	80.0	80.9	.1	6.9
Hardwoods:					
White oak	1,590.6	275.8	926.7	149.6	238.5
Other select white oaks	189.1	47.2	41.4	6.3	94.2
Select red oak	1,050.0	225.0	488.3	93.4	243.3
Other white oaks	427.9	9.7	382.6	3.9	31.7
Black oak	1,225.6	181.2	794.2	42.6	207.6
Other red oaks	354.0	106.0	142.6	18.9	86.5
Hickory	1,201.6	322.6	623.4	80.7	174.9
Hard maple	751.5	89.9	333.3	87.4	240.9
Soft maple	330.5	134.2	48.1	37.8	110.4
Beech	490.9	22.5	291.7	63.2	113.5
Sweetgum	131.8	47.9	53.3	21.4	9.2
Tupelo and blackgum	97.7	24.5	64.2	6.6	2.4
Ash	485.9	102.0	168.1	31.9	183.9
Cottonwood	279.2	39.9	42.2	3.5	193.6
Aspen	48.9	11.8	13.3	7.3	16.5
Basswood	111.4	17.2	43.9	5.6	44.7
Yellow-poplar	650.8	187.6	328.9	52.3	82.0
Black walnut	177.8	42.0	60.0	2.2	73.6
Black cherry	105.4	12.8	50.4	6.0	36.2
Elm	202.2	48.6	86.4	4.9	62.3
Sycamore	504.9	135.0	231.1	6.0	132.8
Other hardwoods	309.8	108.1	88.1	8.5	105.1
Total hardwoods	10,717.5	2,191.5	5,302.2	740.0	2,483.8
All species	10,885.4	2,271.5	5,383.1	740.1	2,490.7

1/ International 1/4-inch rule.

Table 32. — *Net volume of growing stock and sawtimber on commercial forest land, by species, Indiana, 1967*

Species	Growing stock	Sawtimber
	Million cubic feet	Million board feet 1/
Softwood species:		
Shortleaf and loblolly pine		
Shortleaf pine	10.8	10.1
Other yellow pines		
Virginia pine	21.0	48.8
Cypress	11.6	78.7
Other eastern softwood group		
Eastern redcedar	11.2	22.1
Tamarack	2.0	6.5
Scotch pine	.4	-
Red pine	1.3	-
White pine	2.5	1.7
Total softwoods	60.8	167.9
Hardwood species:		
Select white oak		
White oak	495.9	1,590.6
Other select white oak group		
Swamp white oak	8.6	34.3
Bur oak	6.6	27.7
Swamp chestnut oak	.8	3.7
Chinkapin oak	34.6	123.4
Select red oak		
Northern red oak	270.5	1,047.5
Cherry bark oak	.1	.4
Shumard oak	.6	2.1
Other white oak group		
Chestnut oak	115.9	414.8
Post oak	4.0	13.1
Other red oaks		
Black oak	318.5	1,225.6
Other red oak group		
Scarlet oak	13.1	58.3
Southern red oak	.3	1.7
Shingle oak	4.2	8.6
Pin oak	84.3	285.4
Hickory group		
Mockernut hickory	36.6	104.5
Shagbark hickory	155.3	390.4
Shellbark hickory	16.1	61.6
Pecan	8.6	40.4
Pignut hickory	145.2	370.0
Bitternut hickory	80.0	234.7
Hard maple		
Sugar maple	287.6	751.5
Soft maple group		
Red maple	108.6	289.1
Silver maple	12.2	37.0
Boxelder	5.5	4.4
Hardwood species (Continued):		
Beech	132.0	490.9
Sweetgum	49.9	131.8
Tupelo and blackgum		
Swamp tupelo	30.2	97.7
Ash group		
White ash	185.6	479.5
Black ash	4.5	5.6
Green ash	.3	-
Blue ash	.9	.8
Cottonwood		
Eastern cottonwood	69.4	279.2
Aspen group		
Balsam poplar	.5	3.0
Bigtooth aspen	22.2	42.2
Quaking aspen	2.3	3.7
Basswood	31.5	111.4
Yellow-poplar	183.5	650.8
Black walnut	64.5	177.8
Black cherry	48.5	105.4
Elm group		
Winged elm	.7	-
American elm	45.0	86.5
Siberian elm	.7	-
Slippery elm	48.3	115.7
Rock elm	1.2	-
Sycamore	149.8	504.9
Other eastern hardwood group		
Yellow birch	2.7	7.7
River birch	8.4	22.6
Paper birch	-	-
Ohio buckeye	3.4	9.7
Hackberry	23.8	69.1
Northern catalpa	.7	3.2
Flowering dogwood	.4	-
Common persimmon	8.4	5.6
Honeylocust	11.7	33.6
Kentucky coffeetree	2.9	9.8
Butternut	6.5	14.3
Osage-orange	.7	-
Cucumber	-	.3
Black locust	21.5	17.4
Black willow	18.8	50.6
Sassafras	47.1	65.9
Total hardwoods	3,442.2	10,717.5
All species	3,503.0	10,885.4

1/ International 1/4-inch rule.

Table 33. — *Cubic-foot volume in short-log trees on commercial forest land, by species and diameter classes, Indiana, 1967*
(Million cubic feet)

Species	All diameters	Diameter class (inches at breast height)							
		11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-22.9	23.0-28.9	29.0 and larger
Softwoods:									
Shortleaf and loblolly pine	0.1	0.1	-	-	-	-	-	-	-
Total softwoods	.1	.1	-	-	-	-	-	-	-
Hardwoods:									
White oak	15.4	1.8	2.2	1.7	2.0	1.6	1.7	3.0	1.4
Other select white oaks	1.2	.2	-	-	.3	.2	-	.3	.2
Select red oak	5.3	.4	.8	.8	.8	-	.3	2.2	-
Other white oaks	1.5	.2	.9	-	.2	.2	-	-	-
Black oak	12.0	1.8	1.5	1.8	1.8	1.9	.9	.9	1.4
Other red oaks	2.5	.6	.3	.5	.7	.3	-	.1	-
Hickory	7.1	2.0	1.9	1.1	1.0	.9	.2	-	-
Hard maple	9.0	2.1	1.8	1.1	2.2	.2	.7	.9	-
Soft maple	5.8	2.3	1.4	.6	.2	.3	.2	.6	.2
Beech	4.5	1.2	.3	1.0	1.0	.6	.2	.2	-
Sweetgum	.6	.2	-	-	-	.1	.3	-	-
Tupelo and blackgum	.1	-	.1	-	-	-	-	-	-
Ash	4.4	1.7	.7	.7	.5	.1	.2	.5	-
Cottonwood	.2	-	-	-	-	-	-	.2	-
Basswood	1.0	-	-	.8	-	-	-	.2	-
Yellow-poplar	.7	.3	-	-	-	-	-	.4	-
Black walnut	6.1	1.5	.4	.6	3.5	.1	-	-	-
Black cherry	1.2	.5	.7	-	-	-	-	-	-
Elm	1.8	.9	.1	.2	.5	-	-	-	.1
Sycamore	2.0	.1	.5	.6	.2	-	.6	-	-
Other hardwoods	3.3	1.1	.8	.8	-	-	.4	.2	-
Total hardwoods	85.7	18.9	14.4	12.3	14.9	6.5	5.7	9.7	3.3
All species	85.8	19.0	14.4	12.3	14.9	6.5	5.7	9.7	3.3

Table 34. — *Sawtimber volume in short-log trees on commercial forest land, by species and diameter classes, Indiana, 1967*
(Million board feet)[1]

Species	All diameters	Diameter class (inches at breast height)								
		9.0- 2/: 10.9	11.0-: 12.9	13.0-: 14.9	15.0-: 16.9	17.0-: 18.9	19.0-: 20.9	21.0-: 22.9	23.0-: 28.9	29.0 and larger
Softwoods:										
Shortleaf and loblolly pine	0.3	0.1	0.2	-	-	-	-	-	-	-
Other yellow pines	.1	-	-	-	-	-	0.1	-	-	-
Other softwoods	.1	.1	-	-	-	-	-	-	-	-
Total softwoods	.5	.2	.2	-	-	-	.1	-	-	-
Hardwoods:										
White oak	43.1	-	3.9	5.7	3.7	6.3	4.3	4.1	8.8	6.3
Other select white oaks	4.2	-	.4	-	-	1.2	.6	-	.7	1.3
Select red oak	14.4	-	1.2	1.9	2.6	2.1	-	.9	5.7	-
Other white oaks	3.6	-	.4	2.1	.1	.6	.4	-	-	-
Black oak	31.6	-	4.8	3.8	4.8	4.8	4.8	2.7	2.4	3.5
Other red oaks	6.9	-	1.9	.8	1.4	1.5	.7	-	.6	-
Hickory	19.3	-	5.4	5.2	2.6	2.6	3.0	.5	-	-
Hard maple	22.2	-	3.7	4.4	3.0	5.3	.5	1.9	3.4	-
Soft maple	11.7	-	3.9	2.7	1.3	.6	.7	.7	1.2	.6
Beech	13.3	-	3.1	.6	2.3	3.6	1.3	.8	1.6	-
Sweetgum	1.1	-	.3	-	-	-	.4	.4	-	-
Tupelo and blackgum	.1	-	-	.1	-	-	-	-	-	-
Ash	11.8	-	3.9	2.4	1.9	1.3	.2	.8	1.3	-
Cottonwood	.8	-	-	-	-	-	-	-	.8	-
Basswood	2.8	-	-	-	2.0	-	-	-	.8	-
Yellow-poplar	2.0	-	.5	-	.1	-	-	-	1.4	-
Black walnut	6.9	-	3.4	.8	1.3	1.2	.2	-	-	-
Black cherry	2.7	-	1.3	1.4	-	-	-	-	-	-
Elm	4.9	-	2.3	.2	.6	1.4	-	-	-	.4
Sycamore	3.5	-	-	1.0	1.0	.4	-	1.1	-	-
Other hardwoods	8.9	-	2.8	1.8	2.2	-	-	.9	1.2	-
Total hardwoods	215.8	-	43.2	34.9	30.9	32.9	17.1	14.8	29.9	12.1
All species	216.3	.2	43.4	34.9	30.9	32.9	17.2	14.8	29.9	12.1

1/ International 1/4-inch rule.
2/ Softwoods only.

Table 35. — *Net volume of growing stock on commercial forest land, by species and forest types, Indiana, 1967*
(Million cubic feet)

Species	All forest types	Loblolly-shortleaf pine	Oak-pine	Oak-hickory	Oak-gum-cypress	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch
Softwoods:								
Shortleaf and loblolly pine	10.8	6.8	3.6	0.1	-	-	0.2	0.1
Other yellow pines	21.0	13.2	4.6	2.5	-	0.1	-	.6
Cypress	11.6	-	-	-	11.6	-	-	-
Other softwoods	17.4	2.3	4.4	6.8	-	.5	3.3	.1
Total softwoods	60.8	22.3	12.6	9.4	11.6	.6	3.5	.8
Hardwoods:								
White oak	495.9	.1	4.0	442.6	.7	5.2	43.3	-
Other select white oaks	50.6	-	-	33.7	4.1	5.0	7.8	-
Select red oak	271.2	-	1.6	225.8	3.0	5.2	35.0	.6
Other white oaks	119.9	.3	.1	114.6	-	-	4.9	-
Black oak	318.5	1.7	2.0	295.8	1.2	3.3	14.5	-
Other red oaks	101.9	-	-	78.1	9.1	8.8	5.5	.4
Hickory	441.8	.1	2.3	358.7	2.5	22.9	55.3	-
Hard maple	287.6	.3	1.2	89.9	-	4.8	191.4	-
Soft maple	126.3	-	-	30.7	6.5	68.7	19.4	1.0
Beech	132.0	.1	-	38.2	-	1.8	91.9	-
Sweetgum	49.9	.3	.2	30.4	10.2	1.7	6.4	.7
Tupelo and blackgum	30.2	-	-	21.4	.4	.7	7.7	-
Ash	191.3	.3	1.2	88.6	5.4	43.9	51.9	-
Cottonwood	69.4	-	-	3.8	.8	61.1	3.7	-
Aspen	25.0	-	-	18.6	.3	3.0	1.1	2.0
Basswood	31.5	-	-	8.4	-	4.3	18.8	-
Yellow-poplar	183.5	.1	.9	139.3	.1	7.7	35.2	.2
Black walnut	64.5	-	-	28.2	.4	15.5	20.4	-
Black cherry	48.5	.1	.4	24.8	-	4.3	18.9	-
Elm	95.9	-	.2	36.8	.4	18.9	39.5	.1
Sycamore	149.8	.8	.2	45.1	2.5	83.9	17.3	-
Other hardwoods	157.0	.1	1.0	67.8	2.8	40.2	41.2	3.9
Total hardwoods	3,442.2	4.3	15.3	2,221.3	50.4	410.9	731.1	8.9
All species	3,503.0	26.6	27.9	2,230.7	62.0	411.5	734.6	9.7

Table 36. — *Net volume of sawtimber on commercial forest land, by species and forest types, Indiana, 1967*
(Million board feet)[1]

Species	All forest types	Loblolly-shortleaf pine	Oak pine	Oak-hickory	Oak-gum-cypress	Elm-ash-Cottonwood	Maple-beech-birch	Aspen-birch
Softwoods:								
Shortleaf and loblolly pine	10.1	7.8	2.3	-	-	-	-	-
Other yellow pines	48.8	29.7	12.3	6.8	-	-	-	-
Cypress	78.7	-	-	-	78.7	-	-	-
Other softwoods	30.3	.4	14.8	7.2	-	-	7.9	-
Total softwoods	167.9	37.9	29.4	14.0	78.7	-	7.9	-
Hardwoods:								
White oak	1,590.6	.4	10.5	1,381.6	3.1	16.2	178.8	-
Other select white oaks	189.1	-	-	126.5	15.2	22.3	25.1	-
Select red oak	1,050.0	-	4.7	859.5	11.6	19.5	154.1	0.6
Other white oaks	427.9	.6	.5	410.5	-	-	16.3	-
Black oak	1,225.6	7.0	8.5	1,142.6	3.3	10.8	53.4	-
Other red oaks	354.0	-	-	265.5	36.8	29.1	21.0	1.6
Hickory	1,201.6	.4	5.8	920.1	11.1	83.1	181.1	-
Hard maple	751.5	-	2.8	184.9	-	9.4	554.4	-
Soft maple	330.5	-	-	77.9	21.4	167.8	63.4	-
Beech	490.9	.2	-	130.4	-	7.3	353.0	-
Sweetgum	131.8	-	-	81.4	27.1	3.8	18.9	.6
Tupelo and blackgum	97.7	-	-	64.9	2.1	1.7	29.0	-
Ash	485.9	.2	.9	214.3	8.6	90.5	171.4	-
Cottonwood	279.2	-	-	14.9	3.4	251.3	9.6	-
Aspen	48.9	-	-	37.3	-	5.5	3.9	2.2
Basswood	111.4	-	-	22.3	-	15.2	73.9	-
Yellow-poplar	650.8	.4	1.8	494.3	-	24.4	129.9	-
Black walnut	177.8	-	-	59.2	1.5	44.7	72.4	-
Black cherry	105.4	-	1.9	48.6	-	4.8	50.1	-
Elm	202.2	-	-	72.8	.7	44.0	84.7	-
Sycamore	504.9	1.0	-	141.3	10.5	301.9	50.2	-
Other hardwoods	309.8	-	1.1	89.3	9.8	118.1	88.1	3.4
Total hardwoods	10,717.5	10.2	38.5	6,840.1	166.2	1,271.4	2,382.7	8.4
All species	10,885.4	48.1	67.9	6,854.1	244.9	1,271.4	2,390.6	8.4

1/ International 1/4-inch rule.

Table 37. — *Walnut volume on nonforest land, by diameter classes, Indiana, 1967*

Diameter class (inches at breast height)	Growing stock	Sawtimber		Short-log trees	
	Thousand cubic feet	Thousand board feet 1/		Thousand cubic feet	Thousand board feet 1/
5.0- 6.9	122	-		-	-
7.0- 8.9	478	-		-	-
9.0-10.9	827	-		-	-
11.0-12.9	674	3,011		435	1,011
13.0-14.9	1,756	6,660		832	2,391
15.0-16.9	2,515	8,479		172	457
17.0-18.9	560	2,486		-	-
19.0-20.9	431	2,304		635	2,711
21.0-22.9	599	2,027		-	-
23.0-24.9	285	776		181	654
25.0+	-	-		390	792
All diameters	8,247	25,743		2,645	8,016

1/ International 1/4-inch rule.

Table 38. — *Walnut volume on nonforest land, by Forest Survey Units, Indiana, 1967*

Survey Unit	Growing stock	Sawtimber	Short-log trees	
	Thousand cubic feet	Thousand board feet 1/	Thousand cubic feet	Thousand board feet 1/
Lower Wabash Unit	1,078	4,177	426	1,329
Knobs Unit	2,113	7,350	469	1,403
Upland Flats Unit	1,480	4,749	169	484
Northern Unit	3,576	9,467	1,581	4,800
All Units	8,247	25,743	2,645	8,016

1/ International 1/4-inch rule.

Table 39. — *Net volume of growing stock on commercial forest land, by counties and species groups, Indiana, 1967*
(Million cubic feet)

County	All species	Soft-woods	White oak group	Red oak group	Hickory	Hard maple	Soft maple	Beech	Ash	Cotton-wood	Yellow-poplar	Sycamore	Other hard-woods
Adams	13.6	-	1.6	2.4	1.1	0.8	0.8	0.2	1.1	1.5	0.4	1.3	2.4
Allen	30.2	0.2	3.6	4.8	2.5	2.0	1.7	.9	2.6	3.2	.8	2.3	5.6
Bartholomew	33.4	-	4.2	5.6	2.8	4.0	1.7	1.9	3.3	1.5	.8	1.6	6.0
Benton	.8	-	.1	.2	-	-	.1	-	.1	-	-	.1	.2
Blackford	6.3	.1	.8	1.1	.5	.7	.3	.2	.5	.7	.1	.2	1.1
Boone	6.1	.3	1.0	1.3	.7	.5	.3	.1	.6	-	.2	.2	.9
Brown	144.1	2.3	38.1	33.1	19.4	11.5	1.8	6.8	5.1	.2	7.9	3.9	14.0
Carroll	11.8	.1	1.9	2.2	1.4	.7	.5	.2	1.2	.2	.4	.5	2.5
Cass	17.1	.1	2.1	3.2	1.5	2.0	.7	.8	1.7	.8	.4	.4	3.4
Clark	93.9	4.9	23.8	19.9	12.1	7.4	1.1	3.7	3.6	.4	4.5	2.9	9.6
Clay	47.5	.6	5.9	9.0	7.2	2.5	2.9	.4	2.8	.5	3.6	2.8	9.3
Clinton	6.9	.1	.6	1.0	.5	.7	.5	.2	.9	.1	.2	.4	1.7
Crawford	103.7	2.9	26.7	22.9	14.3	7.5	1.0	4.5	3.6	.4	5.8	3.8	10.3
Daviess	39.0	-	5.0	6.9	6.3	1.8	3.2	.5	2.4	.7	2.5	2.1	7.6
Dearborn	23.0	-	4.4	3.7	2.2	3.5	1.5	2.2	1.2	-	1.3	.1	2.9
Decatur	21.8	.2	2.6	3.8	1.6	2.4	1.1	1.3	2.1	1.0	.5	1.2	4.0
De Kalb	18.7	.1	1.8	3.1	1.4	1.3	1.1	.5	1.7	2.4	.5	1.4	3.4
Delaware	10.4	-	1.1	1.8	.7	1.5	.5	.7	.8	.3	.3	.4	2.3
Dubois	100.8	2.1	23.3	20.9	13.4	8.5	1.5	4.5	4.1	.9	5.1	4.4	12.1
Elkhart	18.4	.1	2.3	3.5	1.5	1.3	1.3	.6	1.8	1.2	.4	.7	3.7
Fayette	12.7	-	2.3	2.2	1.1	1.9	.7	1.1	.7	.1	.8	.1	1.7
Floyd	38.8	1.5	9.8	8.6	5.2	3.1	.4	1.8	1.3	.1	2.1	.9	4.0
Fountain	25.7	.3	2.9	4.5	2.4	3.3	1.2	1.2	2.2	1.3	.6	1.3	4.5
Franklin	42.5	.1	8.3	7.7	4.7	7.1	2.0	3.1	2.4	.3	2.0	.4	4.4
Fulton	14.3	.1	2.0	2.9	1.3	1.3	.8	.6	1.0	1.0	.4	.3	2.6
Gibson	48.6	.9	6.0	7.1	6.4	2.8	5.0	.5	3.2	1.0	3.0	3.1	9.6
Grant	10.8	-	1.3	2.0	.9	1.5	.5	.8	.8	.6	.4	.2	1.8
Greene	88.1	.3	12.3	17.7	13.5	4.5	5.5	.9	5.0	.7	7.0	3.9	16.8
Hamilton	11.2	-	1.7	2.1	1.0	.8	.5	.3	1.0	1.6	.3	.3	1.6
Hancock	6.0	-	.5	.9	.5	.9	.2	.2	.8	.1	.2	.2	1.5
Harrison	122.0	4.8	29.3	26.0	16.6	9.3	1.3	5.4	4.4	.6	6.7	5.0	12.6
Hendricks	12.3	-	1.5	2.1	1.2	.7	.7	.4	1.3	.6	.5	1.1	2.2
Henry	12.1	-	1.6	2.2	1.1	1.5	.4	.6	1.0	.2	.5	.3	2.7
Howard	5.9	.1	.7	1.0	.5	.4	.3	.1	.5	.7	.1	.6	.9
Huntington	15.9	.3	2.3	3.0	1.4	1.3	1.0	.4	1.3	1.1	.5	.6	2.7
Jackson	118.7	2.3	28.3	24.9	14.9	10.4	1.7	5.6	4.6	.9	6.0	5.4	13.7
Jasper	18.3	.2	2.6	4.1	1.9	1.2	.7	.6	1.6	1.0	.6	.6	3.2
Jay	18.2	-	1.8	3.3	1.4	2.4	.9	.9	1.6	1.5	.4	.6	3.4
Jefferson	42.5	.1	8.2	8.1	5.5	5.8	2.0	2.6	2.7	-	2.1	.5	4.9
Jennings	56.6	-	10.8	10.1	7.1	9.2	2.7	4.6	2.7	.2	2.9	.5	5.8
Johnson	10.5	-	1.3	2.3	.9	.9	.8	.4	.8	.5	.3	.4	1.9
Knox	34.2	.9	4.0	5.5	4.4	1.7	4.5	.3	2.1	.9	2.3	1.9	5.7
Kosciusko	22.4	.1	2.9	4.0	1.9	2.4	.8	.8	2.1	1.1	.7	1.3	4.3
Lagrange	13.9	.2	2.2	2.8	1.4	.9	.6	.3	1.2	.5	.4	1.1	2.3
Lake	8.5	-	1.5	1.7	.7	.3	.4	.2	.7	1.4	.1	.3	1.2
La Porte	21.5	.1	3.3	4.9	2.1	1.3	.9	.5	1.7	1.6	.8	.6	3.7
Lawrence	111.0	1.3	25.3	22.6	15.2	9.0	1.3	5.7	4.1	1.1	6.7	6.2	12.5
Madison	8.2	.1	.5	1.0	.5	1.6	.4	.7	.8	.2	.2	.4	1.8
Marion	11.1	-	1.3	2.0	.9	1.3	.5	.7	1.2	.3	.3	.4	2.2
Marshall	21.2	.3	3.2	4.5	2.1	1.7	.8	.7	1.8	.5	.6	1.3	3.7

(Continued on next page)

Table 39 (Continued)

County	All species	Soft-woods	White oak group	Red oak group	Hickory	Hard maple	Soft maple	Beech	Ash	Cotton-wood	Yellow-poplar	Sycamore	Other hard-woods
Martin	113.0	1.0	16.5	23.5	18.0	6.6	5.3	1.3	5.9	.6	9.4	5.3	19.6
Miami	15.3	-	2.2	2.9	1.6	1.6	.8	.6	1.3	.5	.5	.7	2.6
Monroe	132.5	3.1	33.6	29.5	17.6	10.6	1.3	5.3	4.9	.6	7.5	4.8	13.7
Montgomery	18.0	.3	2.7	4.0	2.0	1.0	.8	.5	1.4	.7	.9	.6	3.1
Morgan	88.3	1.5	22.5	18.8	11.5	7.4	1.1	3.1	3.5	.4	4.7	3.8	10.0
Newton	12.0	-	1.6	2.6	1.2	.6	.8	.2	1.3	.3	.3	.5	2.6
Noble	18.7	.1	2.7	4.2	1.9	1.4	.8	.6	1.4	1.3	.5	.4	3.4
Ohio	8.3	-	1.5	1.4	1.0	1.7	.3	.6	.4	-	.5	.1	.8
Orange	105.5	3.4	23.5	20.2	13.6	9.4	1.0	5.0	3.7	1.4	5.9	6.9	11.5
Owen	113.0	1.7	29.9	25.2	15.2	8.8	1.3	4.6	4.1	.4	5.9	4.1	11.8
Parke	81.4	.9	10.9	15.4	12.2	4.1	5.5	.7	4.8	.9	6.6	4.0	15.4
Perry	146.3	6.3	37.0	31.9	19.4	11.4	1.5	6.3	5.3	.6	7.7	4.8	14.1
Pike	52.3	1.0	6.0	8.2	7.3	2.3	4.1	.4	3.4	.9	3.2	3.4	12.1
Porter	20.9	.1	2.8	4.0	2.1	1.5	1.2	.7	2.2	.6	.8	.8	4.1
Posey	43.0	1.7	5.3	6.7	5.9	2.2	2.9	.5	2.5	1.0	2.8	3.5	8.0
Pulaski	19.1	-	2.8	3.6	2.0	1.9	.8	.6	1.6	.8	.7	.6	3.7
Putnam	69.7	1.8	9.9	13.1	11.2	3.9	4.0	.8	3.9	.6	5.5	3.2	11.8
Randolph	12.6	-	1.6	2.6	.9	1.3	.7	.5	1.2	.8	.4	.3	2.3
Ripley	32.4	.1	5.9	5.8	3.6	4.4	1.7	2.4	2.1	.2	1.8	.6	3.8
Rush	10.5	-	1.1	1.4	.8	1.3	.6	.5	1.1	.8	.3	.5	2.1
St. Joseph	18.3	.1	2.7	3.8	1.6	1.2	1.1	.6	1.6	1.1	.5	.6	3.4
Scott	47.7	.4	11.7	10.0	6.0	4.2	.6	2.0	1.8	.7	2.6	2.9	4.8
Shelby	8.6	.1	.4	1.1	.7	1.1	.4	.4	1.0	.7	.2	.4	2.1
Spencer	62.3	.8	11.9	11.0	8.7	6.4	.8	3.6	2.6	.8	3.3	4.0	8.4
Starke	21.8	.1	2.8	4.6	1.9	1.6	.8	.5	1.6	2.8	.8	.6	3.7
Steuben	17.0	.4	2.0	3.6	1.6	1.4	.7	.7	1.2	1.7	.5	.4	2.8
Sullivan	49.8	.9	5.8	7.6	7.5	2.5	4.3	.6	3.3	1.0	3.0	2.5	10.8
Switzerland	15.9	.1	3.0	3.4	1.6	1.4	.7	1.1	1.0	-	.9	.3	2.4
Tippecanoe	13.4	.1	1.8	2.5	1.3	1.4	.7	.6	1.1	.2	.5	.4	2.8
Tipton	5.1	-	.5	1.0	.4	.5	.4	.2	.5	.7	.1	.2	.6
Union	8.8	-	1.5	1.6	.8	1.1	.5	.8	.5	.2	.3	.2	1.3
Vanderburgh	19.5	.4	2.4	3.3	2.8	1.2	1.5	.2	1.2	.4	1.4	1.2	3.5
Vermillion	37.2	2.1	4.4	5.9	5.1	2.0	3.1	.3	1.8	.4	2.3	2.4	7.4
Vigo	42.9	1.0	5.0	7.0	6.4	2.2	3.1	.4	2.8	1.0	2.7	2.6	8.7
Wabash	17.2	.2	2.1	3.1	1.6	1.1	1.3	.5	1.5	1.4	.6	.7	3.1
Warren	19.1	-	2.5	3.4	1.9	1.5	1.0	.7	1.5	1.3	.7	1.2	3.4
Warrick	53.7	.7	11.1	9.7	7.8	4.6	.9	2.1	2.2	.5	2.9	3.3	7.9
Washington	142.5	2.1	35.9	30.6	19.8	12.9	1.7	7.3	5.2	.5	7.2	4.1	15.2
Wayne	16.8	.1	2.0	3.1	1.4	1.4	.8	.6	1.6	.6	.6	.8	3.8
Wells	16.1	-	2.1	2.8	1.5	1.3	1.1	.6	1.4	1.2	.4	1.0	2.7
White	9.6	-	2.0	2.4	1.1	.7	.4	.2	.7	.1	.4	.3	1.3
Whitley	15.7	.1	2.2	2.9	1.5	1.4	.8	.6	1.4	1.0	.5	.3	3.0
All counties	3,503.0	60.8	666.4	691.6	441.8	287.6	126.3	132.0	191.3	69.4	183.5	149.8	502.5

Table 40. — *Net volume of sawtimber on commercial forest land, by counties and species groups, Indiana, 1967*
(Million board feet)[1]

Species	All species	Soft-woods	White oak group	Red oak group	Hickory	Hard maple	Soft maple	Beech	Ash	Cotton-wood	Yellow-poplar	Sycamore	Other hard-woods
Adams	45.0	-	5.9	9.0	3.0	2.7	1.8	.9	3.2	6.3	1.4	5.7	5.1
Allen	97.4	.5	12.5	17.7	6.3	6.9	4.7	3.7	6.9	13.1	3.0	9.5	12.6
Bartholomew	114.3	-	16.2	21.5	7.0	14.6	5.0	7.6	8.9	7.2	2.9	6.9	16.5
Benton	1.7	-	.2	.7	.1	.1	.3	-	.1	-	.1	.1	-
Blackford	21.5	.2	2.9	4.5	1.5	2.2	.7	.9	1.5	2.9	.4	.5	3.3
Boone	18.7	-	3.7	4.9	1.6	1.8	.8	.5	1.5	.1	.6	.6	2.6
Brown	462.6	3.9	125.8	132.1	51.7	26.8	4.1	25.4	14.1	.6	27.6	13.9	36.6
Carroll	35.4	.3	7.1	8.3	3.2	2.1	1.5	1.0	2.3	.2	1.5	1.9	6.0
Cass	56.1	.3	7.9	12.4	3.7	7.1	2.2	3.2	4.6	2.7	1.5	1.3	9.2
Clark	285.3	11.8	73.6	76.8	32.1	16.8	2.6	14.0	8.5	1.1	15.9	8.6	23.5
Clay	141.0	3.0	19.5	33.8	21.2	5.7	7.2	1.1	6.0	1.9	12.3	9.7	19.6
Clinton	22.6	.2	2.1	3.8	1.2	2.7	1.5	.8	2.6	.5	.6	1.5	5.1
Crawford	307.1	5.6	81.4	85.8	35.2	16.7	2.4	15.6	8.6	1.8	19.8	10.7	23.5
Daviess	112.4	-	17.5	26.3	18.7	3.8	6.4	1.2	5.1	2.5	8.4	6.7	15.8
Dearborn	73.4	-	16.4	13.9	6.6	8.5	5.4	7.5	2.9	-	5.6	.2	6.4
Decatur	71.7	.3	9.7	14.1	4.1	8.7	3.3	5.1	5.6	4.3	1.8	4.8	9.9
De Kalb	60.8	.2	5.8	11.3	3.6	4.8	3.0	2.0	4.5	9.7	1.9	5.9	8.1
Delaware	34.0	-	4.3	6.4	1.8	5.7	1.1	3.0	2.5	.8	1.1	1.6	5.7
Dubois	330.2	4.2	76.7	85.4	40.1	20.9	4.0	18.0	11.5	3.7	18.7	14.8	32.2
Elkhart	60.6	.2	8.4	13.0	3.6	4.4	3.7	2.6	5.3	5.5	1.6	2.6	9.7
Fayette	40.1	-	8.5	8.3	3.4	4.6	2.5	3.8	1.3	.5	3.4	.3	3.5
Floyd	122.9	4.4	31.7	33.8	13.7	7.5	1.0	6.9	3.6	.4	7.3	3.2	9.4
Fountain	84.4	.5	10.3	15.6	5.8	13.0	3.6	5.1	6.3	5.6	2.1	5.2	11.3
Franklin	131.8	-	29.2	27.2	13.3	18.0	6.4	10.6	5.9	.9	8.5	1.1	10.7
Fulton	47.4	.3	7.6	11.2	3.5	3.9	2.3	2.3	2.8	4.5	1.6	1.2	6.2
Gibson	151.6	5.6	21.8	27.4	18.8	6.7	12.5	1.7	7.2	3.7	10.2	10.1	25.9
Grant	36.3	-	4.7	7.5	2.3	5.5	1.3	2.9	2.6	2.7	1.1	.8	4.9
Greene	245.3	.2	39.9	65.1	35.6	9.1	11.9	2.4	11.2	2.9	23.3	11.7	32.0
Hamilton	38.4	-	6.4	8.1	2.9	2.9	1.6	1.3	2.7	6.6	.9	1.2	3.8
Hancock	20.4	.2	1.8	3.4	1.4	3.5	.5	.6	2.4	.6	.6	1.0	4.4
Harrison	380.8	8.1	95.9	103.0	44.7	21.4	3.1	20.7	12.0	2.6	23.4	15.1	30.8
Hendricks	38.2	-	5.6	7.6	2.8	1.7	2.2	1.7	2.8	2.3	1.8	4.3	5.4
Henry	38.6	.2	6.0	8.4	3.1	4.9	1.1	2.3	2.7	.2	1.6	1.1	7.0
Howard	18.6	-	2.1	3.6	1.0	1.3	1.1	.4	1.5	2.7	.4	2.6	1.9
Huntington	50.1	.2	8.7	10.7	3.4	4.4	2.5	1.7	3.6	4.5	1.8	2.3	6.3
Jackson	372.1	4.2	91.2	96.0	40.6	24.6	3.9	21.7	12.4	3.6	22.3	17.1	34.5
Jasper	55.7	.2	9.5	14.8	4.3	3.5	2.3	2.3	3.6	4.1	2.2	1.9	7.0
Jay	63.0	-	6.6	12.4	3.8	9.3	2.5	3.6	5.2	6.6	1.4	2.6	9.0
Jefferson	126.2	.1	27.7	27.5	16.2	13.6	5.5	9.0	6.5	.1	8.5	.9	10.6
Jennings	175.5	-	37.2	36.2	21.8	22.5	8.5	15.5	6.8	.5	11.6	.9	14.0
Johnson	35.4	-	4.9	8.5	2.5	3.1	2.1	1.7	2.5	2.2	1.2	1.5	5.2
Knox	102.1	5.6	13.8	19.7	13.0	4.1	10.1	.9	3.9	3.4	7.6	6.1	13.9
Kosciusko	74.0	.2	10.7	14.8	4.6	8.6	2.5	3.2	5.8	4.4	2.5	5.3	11.4
Lagrange	45.2	.2	8.0	10.2	3.6	3.2	1.8	1.4	3.0	1.9	1.5	4.5	5.9
Lake	29.4	-	5.9	7.0	2.3	1.0	.9	.7	1.4	6.0	.5	1.1	2.6
La Porte	67.8	-	12.2	18.9	5.0	4.1	2.5	2.0	3.7	6.5	2.7	1.9	8.3
Lawrence	350.9	2.2	83.2	88.7	41.7	20.9	3.2	20.9	11.1	4.5	23.7	19.9	30.9
Madison	27.8	.4	1.5	3.9	1.2	6.5	1.0	2.8	2.8	1.0	.7	1.4	4.6
Marion	36.8	.1	4.8	7.8	2.4	4.1	1.7	2.6	3.3	1.5	1.1	1.4	6.0
Marshall	71.0	.2	11.5	17.0	5.7	6.1	2.8	3.0	5.0	2.4	2.1	5.2	10.0

Table 40 (Continued)

(Million board feet) 1/

Species	All species	Soft-woods	White oak group	Red oak group	Hickory	Hard maple	Soft maple	Beech	Ash	Cotton-wood	Yellow-poplar	Sycamore	Other hard-woods
Martin	335.8	5.8	53.5	88.4	49.2	14.6	14.3	3.7	14.0	2.5	32.0	17.1	40.7
Miami	49.5	-	7.9	10.8	3.8	5.6	2.3	2.5	3.8	2.2	1.7	3.1	5.8
Monroe	402.4	4.3	104.9	110.4	45.5	24.1	3.1	19.3	12.5	2.4	27.5	16.3	32.1
Montgomery	52.6	-	9.6	14.0	4.6	3.2	2.2	1.8	3.3	2.1	2.9	1.8	7.1
Morgan	269.5	3.1	70.2	72.2	29.9	17.5	2.4	11.9	8.4	1.5	16.4	12.8	23.2
Newton	36.1	-	6.0	9.2	2.7	2.0	1.8	.7	3.3	1.1	1.3	2.1	5.9
Noble	58.9	.1	10.2	14.9	4.8	5.0	2.3	2.7	3.8	5.3	1.9	1.1	6.8
Ohio	24.6	-	4.9	5.1	2.7	4.2	1.0	2.3	.9	-	1.8	-	1.7
Orange	316.4	4.7	73.3	77.1	35.5	21.2	2.4	18.2	9.4	5.8	20.0	21.2	27.6
Owen	347.2	3.6	93.6	96.6	39.2	20.7	2.9	17.1	10.1	1.4	21.0	13.2	27.8
Parke	235.5	5.7	36.0	57.0	32.4	8.7	12.6	2.2	11.3	3.7	23.1	11.9	30.9
Perry	450.1	11.3	117.6	123.6	50.7	26.7	3.8	23.7	14.0	2.4	26.9	15.0	34.4
Pike	144.0	3.1	19.5	29.6	20.5	5.3	9.5	1.0	7.5	3.3	10.4	11.0	23.3
Porter	64.0	-	10.6	14.8	5.4	4.5	3.4	2.7	4.9	2.1	2.7	2.4	10.5
Posey	137.0	11.3	18.5	26.5	17.2	4.4	7.2	1.4	6.3	3.7	9.6	11.7	19.2
Pulaski	59.3	-	10.3	12.6	4.6	7.1	2.2	2.2	4.5	2.6	2.4	2.6	8.2
Putnam	212.2	11.4	32.6	48.9	31.5	9.4	10.9	2.1	9.3	2.2	18.6	10.5	24.8
Randolph	42.2	-	6.1	10.3	2.7	5.0	2.0	2.2	3.1	3.3	1.3	1.3	4.9
Ripley	98.2	-	20.6	20.2	10.3	10.6	5.0	8.0	4.8	.8	7.4	1.4	9.1
Rush	35.7	-	4.4	5.3	2.2	4.9	1.7	1.8	3.0	3.4	1.0	1.9	6.1
St. Joseph	58.0	.2	9.9	13.7	4.1	3.6	3.1	2.2	4.6	4.2	1.9	2.5	8.0
Scott	154.2	.9	38.4	39.8	16.6	9.6	1.2	7.9	4.8	3.0	9.5	10.0	12.5
Shelby	28.5	.5	1.5	4.0	1.7	4.0	1.2	1.5	3.1	3.0	.6	1.3	6.1
Spencer	203.2	3.0	39.1	43.8	27.3	15.6	1.9	14.0	7.7	3.2	12.1	13.2	22.3
Starke	68.4	.1	9.5	16.1	4.8	5.7	2.3	2.2	3.9	11.3	2.7	1.6	8.2
Steuben	54.1	.4	6.9	13.2	4.2	4.8	2.1	2.8	3.5	7.3	1.7	1.1	6.1
Sullivan	147.0	5.7	20.1	28.6	22.8	5.2	11.9	1.8	6.4	3.6	10.1	8.0	22.8
Switzerland	42.9	-	9.8	11.1	3.7	2.6	1.9	4.0	1.6	-	3.9	.6	3.7
Tippecanoe	40.4	.2	6.8	8.7	3.1	4.6	2.0	2.2	2.8	.4	1.7	1.3	6.6
Tipton	17.3	-	1.9	3.6	1.2	1.9	1.3	.7	1.1	2.7	.3	.9	1.7
Union	27.4	-	5.5	5.4	2.7	2.8	1.6	2.5	1.2	.7	1.6	.6	2.8
Vanderburgh	60.0	2.8	8.0	12.2	7.9	3.3	3.8	.6	2.9	1.6	5.2	3.6	8.1
Vermillion	118.7	14.1	14.9	21.6	14.7	5.0	8.1	1.1	5.0	1.5	7.5	8.6	16.6
Vigo	128.9	5.7	17.1	27.1	19.1	4.6	7.8	1.3	5.9	3.4	9.3	8.3	19.3
Wabash	56.0	.2	7.6	11.3	3.9	3.8	3.1	2.0	4.4	6.1	2.1	3.2	8.3
Warren	62.0	.1	8.9	12.7	4.7	5.2	2.7	2.8	3.8	5.4	2.7	5.4	7.6
Warrick	163.0	1.0	34.7	36.5	22.8	11.1	1.7	8.4	4.7	2.3	10.6	11.1	18.1
Washington	465.2	4.6	119.4	123.5	56.1	31.2	4.4	28.0	14.7	1.9	26.2	15.0	40.2
Wayne	53.0	.2	7.6	11.9	3.6	4.6	1.8	2.3	4.3	2.3	2.1	2.9	9.4
Wells	54.4	-	7.6	10.7	3.9	4.3	3.5	2.4	3.9	5.0	1.7	4.8	6.6
White	31.2	-	7.4	9.3	3.0	2.3	.9	.6	1.7	.2	1.4	.9	3.5
Whitley	50.8	-	8.2	11.3	3.6	4.4	2.6	2.3	3.9	4.0	1.7	1.2	7.6
All counties	10,885.4	167.9	2,207.6	2,629.6	1,201.6	751.5	330.5	490.9	485.9	279.2	650.8	504.9	1,185.0

1/ International 1/4-inch rule.

Table 41.—*Net volume of growing stock and sawtimber on commercial forest land, by counties and kind of material, Indiana, 1967*

County	Growing stock			Sawtimber		
	Total	Poletimber trees	Sawtimber trees	Total	In sawtimber stands	In other stands
	Million cubic feet	Million cubic feet	Million cubic feet	Million 1/ board feet	Million 1/ board feet	Million 1/ board feet
Adams	13.6	3.5	10.1	45.0	41.8	3.2
Allen	30.2	8.3	21.9	97.4	88.0	9.4
Bartholomew	33.4	7.8	25.6	114.3	105.4	8.9
Benton	0.8	0.4	0.4	1.7	0.6	1.1
Blackford	6.3	1.4	4.9	21.5	19.9	1.6
Boone	6.1	1.9	4.2	18.7	15.6	3.1
Brown	144.1	47.6	96.5	462.6	404.7	57.9
Carroll	11.8	3.7	8.1	35.4	29.8	5.6
Cass	17.1	4.4	12.7	56.1	51.8	4.3
Clark	93.9	34.2	59.7	285.3	230.0	55.3
Clay	47.5	15.8	31.7	141.0	121.1	19.9
Clinton	6.9	1.7	5.2	22.6	20.3	2.3
Crawford	103.7	39.1	64.6	307.1	239.5	67.6
Daviess	39.0	13.3	25.7	112.4	94.1	18.3
Dearborn	23.0	5.9	17.1	73.4	70.8	2.6
Decatur	21.8	5.8	16.0	71.7	65.1	6.6
De Kalb	18.7	5.1	13.6	60.8	55.0	5.8
Delaware	10.4	2.8	7.6	34.0	30.8	3.2
Dubois	100.8	31.7	69.1	330.2	293.2	37.0
Elkhart	18.4	4.8	13.6	60.6	54.3	6.3
Fayette	12.7	3.4	9.3	40.1	39.1	1.0
Floyd	38.8	13.2	25.6	122.9	104.3	18.6
Fountain	25.7	6.5	19.2	84.4	78.0	6.4
Franklin	42.5	12.0	30.5	131.8	126.1	5.7
Fulton	14.3	3.6	10.7	47.4	43.3	4.1
Gibson	48.6	14.4	34.2	151.6	135.8	15.8
Grant	10.8	2.4	8.4	36.3	33.8	2.5
Greene	88.1	31.7	56.4	245.3	204.7	40.6
Hamilton	11.2	2.5	8.7	38.4	35.9	2.5
Hancock	6.0	1.4	4.6	20.4	18.6	1.8
Harrison	122.0	42.2	79.8	380.8	324.7	56.1
Hendricks	12.3	3.7	8.6	38.2	33.1	5.1
Henry	12.1	3.3	8.8	38.6	33.5	5.1
Howard	5.9	1.7	4.2	18.6	17.2	1.4
Huntington	15.9	4.5	11.4	50.1	43.4	6.7
Jackson	118.7	40.3	78.4	372.1	316.2	55.9
Jasper	18.3	5.6	12.7	55.7	46.9	8.8
Jay	18.2	4.0	14.2	63.0	59.9	3.1
Jefferson	42.5	13.3	29.2	126.2	119.0	7.2
Jennings	56.6	15.9	40.7	175.5	167.5	8.0
Johnson	10.5	2.7	7.8	35.4	33.0	2.4
Knox	34.2	11.1	23.1	102.1	86.3	15.8
Kosciusko	22.4	5.7	16.7	74.0	66.9	7.1
Lagrange	13.9	3.7	10.2	45.2	40.3	4.9
Lake	8.5	1.8	6.7	29.4	27.3	2.1
La Porte	21.5	6.3	15.2	67.8	59.2	8.6
Lawrence	111.0	36.8	74.2	350.9	300.4	50.5
Madison	8.2	1.9	6.3	27.8	26.0	1.8
Marion	11.1	2.9	8.2	36.8	33.5	3.3
Marshall	21.2	5.3	15.9	71.0	66.0	5.0
Martin	113.0	37.1	75.9	335.8	294.1	41.7
Miami	15.3	4.2	11.1	49.5	43.5	6.0
Monroe	132.5	47.8	84.7	402.4	330.6	71.8
Montgomery	18.0	6.1	11.9	52.6	43.5	9.1
Morgan	88.3	31.4	56.9	269.5	220.2	49.3
Newton	12.0	3.8	8.2	36.1	30.9	5.2
Noble	18.7	5.4	13.3	58.9	52.2	6.7
Ohio	8.3	2.6	5.7	24.6	23.2	1.4
Orange	105.5	38.5	67.0	316.4	258.4	58.0
Owen	113.0	40.0	73.0	347.2	285.1	62.1
Parke	81.4	28.2	53.2	235.5	202.7	32.8
Perry	146.3	52.1	94.2	450.1	372.7	77.4
Pike	52.3	19.3	33.0	144.0	115.6	28.4
Porter	20.9	6.4	14.5	64.0	54.3	9.7
Posey	43.0	12.7	30.3	137.0	124.2	12.8
Pulaski	19.1	5.8	13.3	59.3	50.8	8.5
Putnam	69.7	22.3	47.4	212.2	185.4	26.8
Randolph	12.6	3.1	9.5	42.2	38.6	3.6
Ripley	32.4	9.6	22.8	98.2	92.6	5.6
Rush	10.5	2.4	8.1	35.7	32.7	3.0
St. Joseph	18.3	5.3	13.0	58.0	50.9	7.1
Scott	47.7	15.5	32.2	154.2	134.8	19.4
Shelby	8.6	2.1	6.5	28.5	26.7	1.8
Spencer	62.3	19.6	42.7	203.2	178.9	24.3
Starke	21.8	6.2	15.6	68.4	59.8	8.6
Steuben	17.0	4.8	12.2	54.1	47.7	6.4
Sullivan	49.8	16.5	33.3	147.0	124.1	22.9
Switzerland	15.9	5.7	10.2	42.9	37.3	5.6
Tippecanoe	13.4	4.1	9.3	40.4	35.3	5.1
Tipton	5.1	1.1	4.0	17.3	16.5	.8
Union	8.8	2.4	6.4	27.4	26.1	1.3
Vanderburgh	19.5	6.0	13.5	60.0	54.0	6.0
Vermillion	37.2	11.3	25.9	118.7	107.2	11.5
Vigo	42.9	13.7	29.2	128.9	111.1	17.8
Wabash	17.2	4.7	12.5	56.0	50.3	5.7
Warren	19.1	5.3	13.8	62.0	56.0	6.0
Warrick	53.7	19.2	34.5	163.0	127.3	35.7
Washington	142.5	45.4	97.1	465.2	413.6	51.6
Wayne	16.8	4.8	12.0	53.0	45.7	7.3
Wells	16.1	4.0	12.1	54.4	50.4	4.0
White	9.6	2.5	7.1	31.2	27.4	3.8
Whitley	15.7	4.2	11.5	50.8	44.9	5.9
All counties	3,503.0	1,126.2	2,376.8	10,885.4	9,429.0	1,456.4

(Continued on next page)

1/ International 1/4-inch rule.

Table 42. — *Net annual growth and removals of growing stock on commercial forest land, by species, Indiana, 1966*

(Thousand cubic feet)

Species	Net annual growth	Annual timber removals
Softwoods:		
Shortleaf and loblolly pine	422	84
Other yellow pines	725	58
Cypress	17	164
Other softwoods	2,211	94
Total softwoods	3,375	400
Hardwoods:		
White oak	8,103	5,541
Other select white oaks	731	1,515
Select red oak	7,762	5,998
Other white oaks	979	1,193
Black oak	7,383	6,844
Other red oaks	3,945	3,598
Hickory	7,335	3,485
Hard maple	6,636	5,238
Soft maple	6,387	4,613
Beech	1,740	3,588
Sweetgum	493	1,515
Tupelo and blackgum	911	571
Ash	8,624	3,500
Cottonwood	2,649	4,258
Aspen	1,666	253
Basswood	639	753
Yellow-poplar	9,193	3,902
Black walnut	2,524	2,810
Black cherry	1,537	424
Elm	341	675
Sycamore	5,821	2,988
Other hardwoods	6,300	1,238
Total hardwoods	91,699	64,500
All species	95,074	64,900

Table 43. — *Net annual growth and removals of growing stock on commercial forest land, by ownership classes and by softwoods and hardwoods, Indiana, 1966*

(Thousand cubic feet)

Ownership class	Net annual growth			Annual removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
National Forest	4,417	363	4,054	376	-	376
Other public	4,448	299	4,149	386	10	376
Forest industry	517	20	497	738	-	738
Farmer and miscellaneous private	85,692	2,693	82,999	63,400	390	63,010
All ownerships	95,074	3,375	91,699	64,900	400	64,500

Table 44. — *Net annual growth and removals of sawtimber on commercial forest land, by species, Indiana, 1966*

(Thousand board feet)[1]

Species	Net annual growth	Annual timber removals
Softwoods:		
Shortleaf and loblolly pine	101	89
Other yellow pines	4,044	208
Cypress	109	607
Other softwoods	3,342	96
Total softwoods	7,596	1,000
Hardwoods:		
White oak	26,838	29,818
Other select white oaks	1,533	7,926
Select red oak	26,804	33,206
Other white oaks	1,689	6,315
Black oak	21,753	37,306
Other red oaks	9,853	16,283
Hickory	11,586	15,479
Hard maple	13,305	31,517
Soft maple	8,284	21,838
Beech	3,874	18,252
Sweetgum	1,034	5,902
Tupelo and blackgum	1,499	2,965
Ash	12,256	18,886
Cottonwood	11,787	20,481
Aspen	3,189	1,131
Basswood	1,537	4,837
Yellow-poplar	33,412	24,625
Black walnut	3,985	17,782
Black cherry	2,560	2,782
Elm	-5,012	4,014
Sycamore	19,087	16,870
Other hardwoods	7,397	5,822
Total hardwoods	218,250	344,037
All species	225,846	345,037

1/ International 1/4-inch rule.

Table 45. — *Net annual growth and removals of sawtimber on commercial forest land, by ownership classes and by softwoods and hardwoods, Indiana, 1966*

(Thousand board feet)[1]

Ownership class	Net annual growth			Annual removals		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
National Forest	6,311	114	6,197	2,278	-	2,278
Other public	8,009	370	7,639	2,266	9	2,257
Forest industry	1,235	42	1,193	4,191	-	4,191
Farmer and miscellaneous private	210,291	7,070	203,221	336,302	991	335,311
All ownerships	225,846	7,596	218,250	345,037	1,000	344,037

1/ International 1/4-inch rule.

Table 46. — *Net annual growth of growing stock on commercial forest land, by species and Forest Survey Units, Indiana, 1966*
(Thousand cubic feet)

Species	All Units	Lower Wabash Unit	Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	422	32	385	-	5
Other yellow pines	725	148	564	-	13
Cypress	17	17	-	-	-
Other softwoods	2,211	312	1,127	2	770
Total softwoods	3,375	509	2,076	2	788
Hardwoods:					
White oak	8,103	965	4,182	546	2,410
Other select white oaks	731	106	198	71	356
Select red oak	7,762	1,305	3,375	511	2,571
Other white oaks	979	22	928	4	25
Black oak	7,383	1,063	4,384	369	1,567
Other red oaks	3,945	716	764	47	2,418
Hickory	7,335	1,471	2,170	533	3,161
Hard maple	6,636	753	3,472	454	1,957
Soft maple	6,387	2,060	1,286	204	2,837
Beech	1,740	-28	1,153	-156	771
Sweetgum	493	142	421	-147	77
Tupelo and blackgum	911	255	532	74	50
Ash	8,624	1,631	2,228	230	4,535
Cottonwood	2,649	168	485	25	1,971
Aspen	1,666	71	307	372	916
Basswood	639	49	103	10	477
Yellow-poplar	9,193	2,605	4,643	311	1,634
Black walnut	2,524	814	820	173	717
Black cherry	1,537	145	451	-17	958
Elm	341	-552	314	-357	936
Sycamore	5,821	952	2,838	174	1,857
Other hardwoods	6,300	2,332	2,118	232	1,618
Total hardwoods	91,699	17,045	37,172	3,663	33,819
All species	95,074	17,554	39,248	3,665	34,607

Table 47. — *Net annual growth of sawtimber on commercial forest land, by species and Forest Survey Units, Indiana, 1966*
(Thousand board feet)[1]

Species	All Units	Lower Wabash Unit	Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	101	-	101	-	-
Other yellow pines	4,044	-	4,044	-	-
Cypress	109	109	-	-	-
Other softwoods	3,342	77	153	2	3,110
Total softwoods	7,596	186	4,298	2	3,110
Hardwoods:					
White oak	26,838	2,030	14,280	816	9,712
Other select white oaks	1,533	488	432	10	603
Select red oak	26,804	4,680	8,772	2,780	10,572
Other white oaks	1,689	101	1,631	14	-57
Black oak	21,753	4,344	12,606	350	4,453
Other red oaks	9,853	2,226	1,756	127	5,744
Hickory	11,586	680	4,650	356	5,900
Hard maple	13,305	421	4,838	70	7,976
Soft maple	8,284	1,369	716	1,137	5,062
Beech	3,874	-243	2,298	-819	2,638
Sweetgum	1,034	-175	965	115	129
Tupelo and blackgum	1,499	252	723	469	55
Ash	12,256	2,860	1,985	201	7,210
Cottonwood	11,787	654	1,530	88	9,515
Aspen	3,189	116	205	107	2,761
Basswood	1,537	216	488	23	810
Yellow-poplar	33,412	10,910	13,097	1,177	8,228
Black walnut	3,985	654	2,117	64	1,150
Black cherry	2,560	123	1,796	56	585
Elm	-5,012	-3,504	-1,362	-2,176	2,030
Sycamore	19,087	4,221	10,223	130	4,513
Other hardwoods	7,397	1,683	3,248	53	2,413
Total hardwoods	218,250	34,106	86,994	5,148	92,002
All species	225,846	34,292	91,292	5,150	95,112

1/ International 1/4-inch rule.

Table 48. — *Annual timber removals from growing stock on commercial forest land, by items and by softwoods and hardwoods, Indiana, 1966*

(Thousand cubic feet)

Item	All species	Soft-woods	Hard-woods
Roundwood products:			
Saw logs	32,104	133	31,971
Veneer logs and bolts	2,049	-	2,049
Pulpwood	6,776	50	6,726
Cooperage logs and bolts	834	-	834
Mine timbers	93	-	93
Posts	139	44	95
Other	2,623	-	2,623
Fuelwood	3,098	-	3,098
All products	47,716	227	47,489
Logging residues	10,316	15	10,301
Other removals	6,868	158	6,710
Total removals	64,900	400	64,500

Table 49. — *Annual timber removals from live sawtimber on commercial forest land, by items and by softwoods and hardwoods, Indiana, 1966*

(Thousand board feet)[1]

Item	All species	Soft-woods	Hard-woods
Roundwood products:			
Saw logs	219,154	670	218,484
Veneer logs and bolts	15,375	-	15,375
Pulpwood	4,831	69	4,762
Cooperage logs and bolts	5,312	-	5,312
Mine timbers	183	-	183
Posts	116	17	99
Other	13,489	-	13,489
Fuelwood	6,160	-	6,160
All products	264,620	756	263,864
Logging residues	44,414	18	44,396
Other removals	36,003	226	35,777
Total removals	345,037	1,000	344,037

1/ International 1/4-inch rule.

Table 50. — *Annual timber removals from growing stock on commercial forest land, by species and Forest Survey Units, Indiana, 1966*

(Thousand cubic feet)

Species	All Units	Lower Wabash Unit	Upland Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	84	67	7	10	-
Other yellow pines	58	-	56	2	-
Cypress	164	162	2	-	-
Other softwoods	94	18	35	34	7
Total softwoods	400	247	100	46	7
Hardwoods:					
White oak	5,541	998	2,186	801	1,556
Other select white oaks	1,515	161	76	66	1,212
Select red oak	5,998	1,131	1,983	700	2,184
Other white oaks	1,193	36	584	-	573
Black oak	6,844	1,172	3,547	179	1,946
Other red oaks	3,598	1,105	934	764	795
Hickory	3,485	854	1,190	413	1,028
Hard maple	5,238	536	1,209	398	3,095
Soft maple	4,613	1,691	1,069	284	1,569
Beech	3,588	429	1,251	809	1,099
Sweetgum	1,515	534	595	297	89
Tupelo and blackgum	571	155	361	48	7
Ash	3,500	756	829	512	1,403
Cottonwood	4,258	2,277	612	282	1,087
Aspen	253	52	125	27	49
Basswood	753	80	63	29	581
Yellow-poplar	3,902	1,113	1,683	373	733
Black walnut	2,810	342	704	443	1,321
Black cherry	424	81	95	31	217
Elm	675	186	192	31	266
Sycamore	2,988	781	949	406	852
Other hardwoods	1,238	624	256	61	297
Total hardwoods	64,500	15,094	20,493	6,954	21,959
All species	64,900	15,341	20,593	7,000	21,966

Table 51. — *Annual timber removals from live sawtimber on commercial forest land, by species and Forest Survey Units, Indiana, 1966*

(Thousand board feet)[1]

Species	All Units	Lower Wabash Unit	Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	89	71	8	10	-
Other yellow pines	208	-	200	8	-
Cypress	607	607	-	-	-
Other softwoods	96	5	40	48	3
Total softwoods	1,000	683	248	66	3
Hardwoods:					
White oak	29,818	5,677	12,285	3,642	8,214
Other select white oaks	7,926	897	413	299	6,317
Northern red oak	33,206	6,855	11,114	2,991	12,246
Other white oaks	6,315	151	3,186	-	2,978
Black oak	37,306	5,722	19,960	763	10,861
Other red oaks	16,283	3,664	5,012	3,281	4,326
Hickory	15,479	4,138	5,451	1,393	4,497
Hard maple	31,517	3,404	7,000	1,132	19,981
Soft maple	21,838	6,181	5,375	834	9,448
Beech	18,252	2,691	7,077	2,481	6,003
Sweetgum	5,902	1,705	3,035	911	251
Tupelo and blackgum	2,965	883	1,857	191	34
Ash	18,886	4,233	4,433	1,857	8,363
Cottonwood	20,481	10,104	2,832	904	6,641
Aspen	1,131	278	572	95	186
Basswood	4,837	511	391	185	3,750
Yellow-poplar	24,625	7,118	10,732	1,950	4,825
Black walnut	17,782	2,136	4,410	2,796	8,440
Black cherry	2,782	528	615	219	1,420
Elm	4,014	989	1,113	191	1,721
Sycamore	16,870	4,648	5,264	1,691	5,267
Other hardwoods	5,822	3,223	1,119	237	1,243
Total hardwoods	344,037	75,736	113,246	28,043	127,012
All species	345,037	76,419	113,494	28,109	127,015

1/ International 1/4-inch rule.

Table 52. — *Output of timber products, by source of material and by softwoods and hardwoods, Indiana, 1966*

Product and species group	Standard units	Total output		Roundwood products		Plant byproducts	
		Number of std. units	Thousand cu. ft.	Number of std. units	Thousand cu. ft.	Number of std. units	Thousand cu. ft.
Sawlogs	M bd. ft.[1/]						
Softwood		783	140	783	140	-	-
Hardwood		222,523	32,611	222,523	32,611	-	-
Total		223,306	32,751	223,306	32,751	-	-
Veneer logs and bolts:	M bd. ft.[1/]						
Hardwood		16,258	2,173	16,258	2,173	-	-
Pulpwood:	Std.cords[2/]						
Softwood		662	51	662	51	-	-
Hardwood		95,778	6,895	93,431	6,726	2,347	169
Total		96,440	6,946	94,093	6,777	2,347	169
Cooperage:	M bd. ft.[1/]						
Hardwood		5,312	834	5,312	834	-	-
Total		5,312	834	5,312	834	-	-
Mine timbers (round):	M cu. ft.						
Hardwood		96	96	96	96	-	-
Total		96	96	96	96	-	-
Posts (round and split):	M pieces						
Softwood		41	44	41	44	-	-
Hardwood		156	200	156	200	-	-
Total		197	244	197	244	-	-
Other: [3/]	M cu. ft.						
Softwood		4	4	-	-	4	4
Hardwood		6,371	6,371	2,679	2,679	3,692	3,692
Total		6,375	6,375	2,679	2,679	3,696	3,696
Total industrial products:							
Softwood		-	239	-	235	-	4
Hardwood		-	49,180	-	45,319	-	3,861
Total		-	49,419	-	45,554	-	3,865
Fuelwood:	Std.cords						
Softwood		40	3	-	-	40	3
Hardwood		163,000	10,936	81,821	5,497	81,179	5,439
Total		163,040	10,939	81,821	5,497	81,219	5,442
All products:							
Softwood		-	242	-	235	-	7
Hardwood		-	60,116	-	50,816	-	9,300
Total		-	60,358	-	51,051	-	9,307

1/ International 1/4-inch rule.

2/ Rough-wood basis (includes chips converted to equivalent standard cord).

3/ Includes particleboard bolts, excelsior bolts, shavings bolts, livestock bedding, and soil conditioner.

Table 53. — *Output of roundwood products, by source and by softwoods and hardwoods, Indiana, 1966*
(Thousand cubic feet)

Products and species group	All sources	Growing-stock trees 1/			Rough and rotten trees	Salvable dead trees	Other sources 2/
		Total	Sawtimber	Poletimber			
Industrial products:							
Saw logs:							
Softwood	140	133	124	9	-	7	-
Hardwood	32,611	31,971	31,936	35	209	214	217
Total	32,751	32,104	32,060	44	209	221	217
Veneer logs and bolts:							
Hardwood	2,173	2,049	2,049	-	-	-	124
Total	2,173	2,049	2,049	-	-	-	124
Pulpwood:							
Softwood	51	50	14	36	1	-	-
Hardwood	6,726	6,726	821	5,905	-	-	-
Total	6,777	6,776	835	5,941	1	-	-
Miscellaneous industrial products:							
Cooperage:							
Hardwood	834	834	834	-	-	-	-
Total	834	834	834	-	-	-	-
Mine timbers (round):							
Hardwood	96	93	36	57	-	-	3
Total	96	93	36	57	-	-	3
Posts (round and split):							
Softwood	44	44	3	41	-	-	-
Hardwood	200	95	24	71	-	-	105
Total	244	139	27	112	-	-	105
Other:							
Hardwood	2,679	2,623	1,929	694	56	-	-
Total	2,679	2,623	1,929	694	56	-	-
All miscellaneous industrial products:							
Softwood	44	44	3	41	-	-	-
Hardwood	3,809	3,645	2,823	822	56	-	108
Total	3,853	3,689	2,826	863	56	-	108
Fuelwood:							
Hardwood	5,497	3,098	1,240	1,858	40	205	2,154
Total	5,497	3,098	1,240	1,858	40	205	2,154
All products:							
Softwood	235	227	141	86	1	7	-
Hardwood	50,816	47,489	38,869	8,620	305	419	2,603
Total	51,051	47,716	39,010	8,706	306	426	2,603

1/ On commercial forest land.
2/ Includes noncommercial forest land, nonforest land (such as fence rows), trees less than 5.0 inches in diameter and limbwood.

Table 54. — *Volume of unused residues of primary manufacturing plants, by industry, type of residue, and softwoods and hardwoods, Indiana, 1966*

(Thousand cubic feet)

Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
Softwoods:				
Coarse 1/	10	10	-	-
Fine 2/	6	6	-	-
Total	16	16	-	-
Hardwoods:				
Coarse 1/	5,798	5,438	129	231
Fine 2/	2,623	2,156	233	234
Total	8,421	7,594	362	465
All species:				
Coarse 1/	5,808	5,448	129	231
Fine 2/	2,629	2,162	233	234
Total	8,437	7,610	362	465

1/ Includes slabs, edgings, and veneer cores.
2/ Includes sawdust and shavings.

Table 55. — *A comparison of the number of primary wood-using plants operating in 1961 and 1966, by Forest Survey Units, Indiana*

(Number of plants)

Kind of plant 1/	All units		Lower Wabash Unit		Knobs Unit		Upland Flats Unit		Northern Unit	
	1961	1966	1961	1966	1961	1966	1961	1966	1961	1966
Sawmills:										
Large 2/	(3/)	86	(3/)	16	(3/)	25	(3/)	4	(3/)	41
Medium 4/	(3/)	55	(3/)	4	(3/)	22	(3/)	2	(3/)	27
Small	(3/)	339	(3/)	41	(3/)	183	(3/)	43	(3/)	72
Total 5/	400	480	63	61	139	230	63	49	135	140
Veneer mills:										
Std. grade	17	18	1	1	5	6	2	2	9	9
Container	2	3	-	1	1	1	-	-	1	1
Total	19	21	1	2	6	7	2	2	10	10
Cooperage mills	10	7	3	2	3	3	2	1	2	1
Handle plants	7	4	1	1	3	2	-	-	3	1
Pulpmills	3	2	1	1	-	-	-	-	2	1
Charcoal plants	-	-	-	-	-	-	-	-	-	-
Misc. plants 6/	5	4	-	1	3	2	1	-	1	1
Grand total	444	518	69	68	154	244	68	52	153	154

1/ Excludes idle mills.
2/ Annual lumber output in excess of 1 million board feet.
3/ Data not available by mill size.
4/ Annual lumber output from 1/2 million to 1 million board feet.
5/ Sawmill totals for 1961 do not include a number of small sawmills.
6/ Includes excelsior plants.

Table 56. — *Value of timber products*[1] *to producer, by Forest Survey Units, Indiana, 1966*
(Thousand dollars)

Survey Unit	All products	Product		
		Lumber logs	Veneer logs	All others
Lower Wabash Unit	3,335	1,930	540	865
Knobs Unit	4,795	2,805	805	1,185
Upland Flats Unit	1,870	725	550	595
Northern Unit	7,005	4,035	2,320	650
All Units	17,005	9,495	4,215	3,295

1/ Value delivered to the mill.

Table 57. — *Annual mortality of growing stock and sawtimber on commercial forest land, by species, Indiana, 1966*

Species	Growing stock	Sawtimber
	Thousand cubic feet	Thousand board feet 1/
Softwoods:		
Shortleaf and loblolly pine	-	-
Other yellow pines	75	120
Cypress	-	-
Other softwoods	72	-
Total softwoods	147	120
Hardwoods:		
White oak	427	965
Other select white oak	436	1,721
Select red oak	829	2,146
Other white oak	335	675
Black oak	1,013	2,623
Other red oak	224	688
Hickory	836	1,221
Hard maple	530	1,393
Soft maple	209	661
Beech	692	2,926
Sweetgum	375	749
Tupelo and blackgum	87	387
Ash	546	1,053
Cottonwood	195	701
Aspen	130	-
Basswood	-	-
Yellow-poplar	-	-
Black walnut	477	1,090
Black cherry	274	739
Elm	2,677	9,791
Sycamore	182	440
Other hardwoods	1,068	1,217
Total hardwoods	11,542	31,186
All species	11,689	31,306

1/ International 1/4-inch rule.

Table 58. — *Annual mortality of growing stock and sawtimber on commercial forest land, by ownership classes and by softwoods and hardwoods, Indiana, 1966*

Ownership class	Growing stock (Thousand cubic feet)			Sawtimber (Thousand board feet) 1/		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
National Forest	406	-	406	352	-	352
Other public	732	-	732	2,243	-	2,243
Forest industry	54	-	54	112	-	112
Farmer and miscellaneous private	10,497	147	10,350	28,599	120	28,479
All ownerships	11,689	147	11,542	31,306	120	31,186

1/ International 1/4-inch rule.

Table 59. — *Annual mortality of growing stock and sawtimber on commercial forest land, by causes and by softwoods and hardwoods, Indiana, 1966*

Cause	Growing stock (Thousand cubic feet)			Sawtimber (Thousand board feet) 1/		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
Fire	805	-	805	1,507	-	1,507
Insects	187	-	187	606	-	606
Disease	5,394	-	5,394	16,689	-	16,689
Other	3,093	147	2,946	6,990	120	6,870
Unknown	2,210	-	2,210	5,514	-	5,514
All causes	11,689	147	11,542	31,306	120	31,186

1/ International 1/4-inch rule.

Table 60. — *Annual allowable cut of growing stock on commercial forest land, by species and Forest Survey Units, Indiana, 1967*
(Thousand cubic feet)

Species	All Units	Lower Wabash Unit	Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	17	-	17	-	-
Other yellow pines	419	-	419	-	-
Cypress	1,162	1,162	-	-	-
Other softwoods	294	-	213	-	81
Total softwoods	1,892	1,162	649	-	81
Hardwoods:					
White oak	18,753	2,961	10,603	1,830	3,359
Other select white oaks	1,970	402	413	118	1,037
Select red oak	8,542	2,032	3,202	569	2,739
Other white oaks	4,712	209	4,281	72	150
Black oak	9,453	1,055	5,670	423	2,305
Other red oaks	2,529	205	1,140	464	720
Hickory	14,006	3,834	6,590	930	2,602
Hard maple	10,669	1,510	4,517	1,406	3,236
Soft maple	5,810	3,025	624	556	1,605
Beech	5,231	287	2,997	610	1,337
Sweetgum	1,242	497	373	318	54
Tupelo and blackgum	1,266	454	539	216	57
Ash	6,660	1,579	1,878	440	2,763
Cottonwood	2,100	476	226	92	1,306
Aspen	345	117	87	88	53
Basswood	947	79	119	114	635
Yellow-poplar	3,907	1,043	2,104	362	398
Black walnut	1,722	253	413	55	1,001
Black cherry	1,357	123	551	172	511
Elm	2,905	860	987	169	889
Sycamore	5,469	1,590	1,786	171	1,922
Other hardwoods	4,763	1,289	1,323	214	1,937
Total hardwoods	114,358	23,880	50,423	9,439	30,616
All species	116,250	25,042	51,072	9,439	30,697

Table 61. — *Annual allowable cut of live sawtimber on commercial forest land, by species and Forest Survey Units, Indiana, 1967*
(Thousand board feet)[1]

Species	All Units	Lower Wabash Unit	Knobs Unit	Upland Flats Unit	Northern Unit
Softwoods:					
Shortleaf and loblolly pine	9	-	9	-	-
Other yellow pines	1,464	-	1,464	-	-
Cypress	7,908	7,908	-	-	-
Other softwoods	996	-	720	-	276
Total softwoods	10,377	7,908	2,193	-	276
Hardwoods:					
White oak	68,741	10,771	37,315	7,219	13,436
Other select white oaks	7,986	1,583	1,473	383	4,547
Select red oak	36,996	8,564	14,213	2,399	11,820
Other white oaks	18,397	701	16,698	306	692
Black oak	40,953	4,356	25,095	1,352	10,150
Other red oaks	10,898	851	5,475	2,531	2,041
Hickory	44,836	13,649	19,894	3,033	8,260
Hard maple	30,524	3,833	11,790	3,350	11,551
Soft maple	18,576	9,254	1,969	2,306	5,047
Beech	20,559	838	12,109	2,024	5,588
Sweetgum	4,534	2,003	1,399	1,060	72
Tupelo and blackgum	5,037	1,708	2,077	1,061	191
Ash	19,831	3,830	5,899	1,230	8,872
Cottonwood	9,227	1,664	973	378	6,212
Aspen	822	495	131	168	28
Basswood	3,585	318	474	329	2,464
Yellow-poplar	16,921	4,590	9,308	1,488	1,535
Black walnut	5,334	704	1,420	69	3,141
Black cherry	4,148	420	1,900	501	1,327
Elm	7,835	2,194	2,759	350	2,532
Sycamore	21,302	5,925	6,698	464	8,215
Other hardwoods	13,573	2,918	3,715	586	6,354
Total hardwoods	410,615	81,169	182,784	32,587	114,075
All species	420,992	89,077	184,977	32,587	114,351

1/ International 1/4-inch rule.

Table 62. — *Removals, net annual growth, and inventory of growing stock and sawtimber on commercial forest land, Indiana, 1967, and projections[1] for 1977, 1987, and 1997*

Year	Removals			Growth			Inventory		
	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods	All species	Soft-woods	Hard-woods
	(Million cubic feet)								
GROWING STOCK									
1967	64.9	0.4	64.5	95.1	3.4	91.7	3,502.9	60.8	3,442.1
1977	73.7	.6	73.1	101.6	6.8	94.8	3,784.2	106.2	3,678.0
1987	84.9	1.0	83.9	104.2	12.5	91.7	4,009.4	195.6	3,813.8
1997	102.3	1.7	100.6	123.5	19.1	104.4	4,175.0	325.3	3,849.7
	(Million board feet) 2/								
SAWTIMBER									
1967	345.0	1.0	344.0	226.0	8.0	218.0	10,885.0	168.0	10,717.0
1977	352.0	2.0	350.0	167.0	11.0	156.0	9,360.0	242.0	9,118.0
1987	359.0	3.0	356.0	150.0	20.0	130.0	7,394.0	376.0	7,018.0
1997	366.0	4.0	362.0	174.0	34.0	140.0	5,360.0	582.0	4,778.0

1/ Based on the following assumptions: (a) that the area of commercial forest land will decline gradually to 3,040,000 acres by 1997; (b) that timber products output for the Nation and for Indiana will increase as a result of population gain and slight increases in per capita consumption; and (c) that the current trend in forest management and programs will continue.

2/ International 1/4-inch rule.

Spencer, John S., Jr.

1969. Indiana's timber.

N. Cent. Forest Exp. Sta., St. Paul, Minn. 61 p., illus. (U.S.D.A. Forest Serv. Resource Bull. NC-7)

The second (1967) survey of Indiana's 4 million forested acres shows 3.5 billion cubic feet of growing stock on 3.9 million acres of commercial forest land. Presented are statistics on timber area, volume, growth, mortality, and use. Projections of timber growth, removals, and inventory are made to 1992, and possible future changes in the forest are discussed.

OXFORD: 905.2(772)

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OXFORD: 905.2(772)

MAJOR FOREST TYPES, INDIANA, 1967
NORTH CENTRAL FOREST EXPERIMENT STATION
FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE

PREVIOUS REPORTS ON INDIANA'S FORESTS

The Forest Survey reports listed below show statistics of Indiana timber resources. These reports may be obtained by writing to the U.S.D.A. Forest Service, North Central Forest Experiment Station, Folwell Avenue, St. Paul, Minnesota 55101.

Pulpwood Production and Consumption in the North Central Region by County, 1965, by James E. Blyth. U.S.D.A. Forest Serv. Resource Bull. NC-2, 24 p., illus. 1966.

Pulpwood Production and Consumption in the North Central Region by County, 1966, by James E. Blyth. U.S.D.A. Forest Serv. Resource Bull. NC-3, 27 p., illus. 1967.

Indiana Sawmills Receive 232 Million Board Feet of Saw Logs in 1966, by James E. Blyth. U.S.D.A. Forest Serv. Res. Note NC-68, 4 p., illus. 1968.

Forest Land in Indiana Counties, 1967, by Burton L. Essex. U.S.D.A. Forest Serv. Res. Note NC-57, 4 p., illus. 1968.

Pulpwood Production and Consumption in the North Central Region by County, 1967, by James E. Blyth. U.S.D.A. Forest Serv. Resource Bull. NC-6, 23 p., illus. 1969.

Timber Volume in Indiana, 1967, by Arnold J. Ostrom. U.S.D.A. Forest Serv. Res. Note NC-58 (Rev.), 4 p., illus. 1969.

Veneer-Log Production and Consumption, North Central Region, 1966, by James E. Blyth. U.S.D.A. Forest Serv. Resource Bull. NC-5, 6 p., illus. 1968.